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Ontario Hydro
1994 Sustainable Development/ Environmental Performance Report



Mission Statement

To make Ontario Hydro a leader in **energy efficiency** and **sustainable development,** and to provide its customers with **safe and reliable** energy services at **competitive prices.**

About Ontario Hydro

Ontario Hydro generates and delivers electricity throughout Ontario, serving as wholesaler of electric power to 306 municipal utilities. These utilities, in turn, sell electricity to customers in their service areas. More than 100 large industrial customers and nearly one million retail customers are served directly by Ontario Hydro. In total, 3.7 million customers are served directly or through the municipal utilities.

Hydro operates a total of 69 hydroelectric, six fossil and five nuclear generating stations. The corporation manages transmission and distribution facilities occupying more than 200,000 hectares. The high-voltage transmission system has 21,125 route kilometres of transmission line, while the distribution system has 109,000 route kilometres of line.

The figures below show Hydro's energy production and installed capacity for 1994.

Figure i
1994 Net Energy Generation
total 147,502 Gigawatt hours
(includes 12,628 GWh in Secondary Sales)

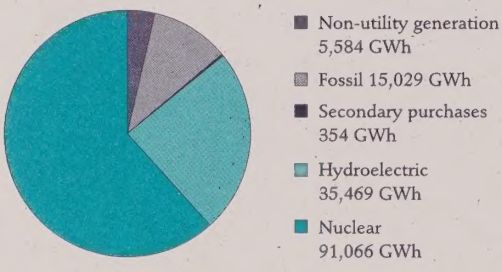
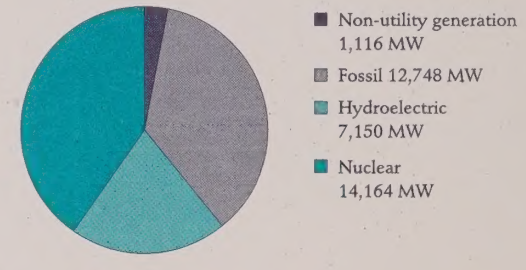


Figure ii
1994 Installed Capacity
total 35,178 Megawatts



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Message from the Chairman and the President & CEO

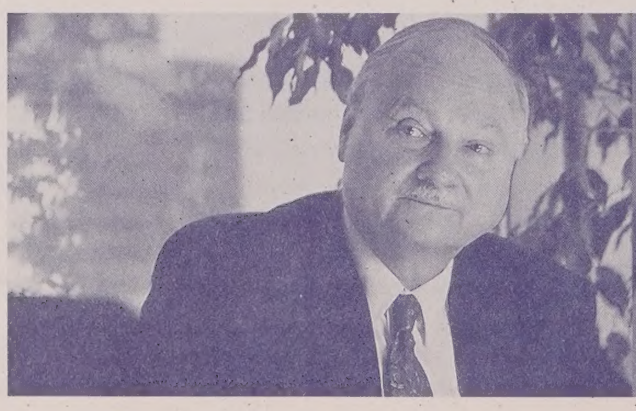
COMPETITIVENESS AND SUSTAINABILITY

Throughout Ontario Hydro in 1994, our transformation into a leader in sustainable energy development (SED) continued hand-in-hand with our efforts to become a more competitive energy services business.

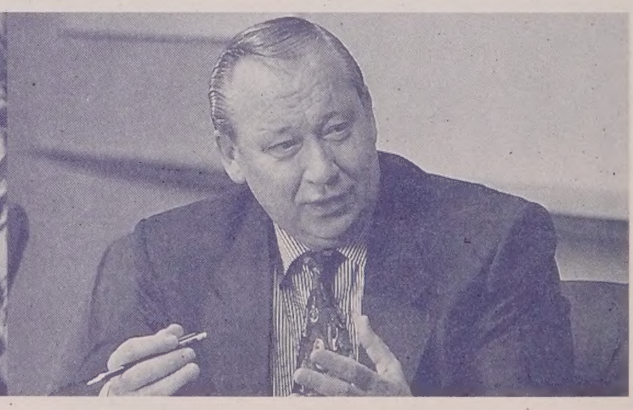
It has become clear that the relationship between these two objectives – competitiveness and sustainability – is not only compatible but also synergistic. Our need to continuously reduce costs, for example, compels us to look for greater efficiencies in our resource use and reuse. At the same time, in our commitment to sustainable development, we are enhancing several vital business skills that contribute to customer satisfaction and profitability: innovation, strategic investing, alliances and a more focused sensitivity to the environmental concerns of our customers and their communities.

In our business, sustainable development is not just an environmental issue but a real and forceful influence on the bottom line. And although we will continue to identify even more opportunities, there are already many examples of the relationship between good business and sustainability at Ontario Hydro. Decreased remediation and pollution control costs, reduced maintenance and energy resource expenditures and rapidly growing international markets for energy efficiency and environmental technologies are three major areas where business and SED principles regularly converge.

Economic arguments, however, should not be the sole rationale for investing in measures that reduce the impact of Hydro's activities on our environment and resource base. There are many things we must do in the name of environmental stewardship, in areas such as forestry and wildlife management, even though we may not yet be able to precisely calculate the future cost of our failure to do so.



Maurice F. Strong, *Chairman*



Dr. Allan Kupcis, *President & CEO*

The issue of global warming is a major case in point. We can only begin to speculate on the long-term environmental, socio-economic and geopolitical effects of a rise in the Earth's temperature. A substantial portion of the international scientific community believes, nevertheless, that the consequences of continuing unabated greenhouse gas emissions are likely to be highly disruptive, if not catastrophic, in the not-too-distant future. Therefore, as one of the world's largest utilities, Ontario Hydro is committed to providing aggressive leadership in the global effort to reduce such emissions. Similarly, our goal of reducing and, ultimately, eliminating Hydro's emission of ozone-depleting substances is not driven by short-term business considerations, but rather by our wish to measurably contribute to a healthier planet, and honour international agreements.

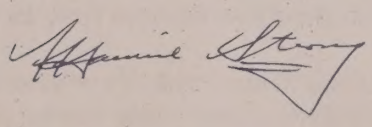
As vital as our atmosphere is to our future, however, it is still only one element of our environment that is affected by energy production and use. Our land and water also suffer when we fail to adequately protect them from the adverse effects of energy use. In these areas too, Ontario Hydro must lead by example. And we are. Among other measures, we are continuing to significantly reduce herbicide use, decontaminate PCB-containing oil, curtail potentially toxic effluents and reduce the volume of waste for which there is no commercial use.

One emerging area of Hydro's business – renewable energy technologies (RETs) – promises to play a major role in helping us deliver cost-effective energy services while we meet – and even exceed – our environmental responsibilities. The recently approved RETs Strategy and Program is a carefully calculated business decision to invest in the commercial development of methods of generating electricity that offer declining costs, increased flexibility, greatly diminished environmental impacts and global marketability.

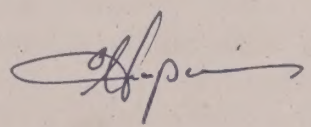
This 1994 Report, like its predecessors, is mainly a technical document that assesses Ontario Hydro's environmental performance against regulatory and corporate objectives. It is used both as a management tool to improve future performance and as a means of communicating to stakeholders Hydro's progress in the fulfilment of its environmental responsibilities. The report is separated into five major areas or pillars of sustainable energy development: continuously improving environmental performance; promoting energy and resource use efficiency; increasing use of renewable energy; integrating environment into business decisions; and social integrity. This report is the transition between Hydro's previous annual environmental performance reports and the sustainability reports that will replace them beginning in 1995.

This change is the fulfillment of a recommendation in the 1993 *Strategy for Sustainable Energy Development and Use for Ontario Hydro* report. We begin this year to detail Hydro's SED-related progress through reference to a framework of Sustainable Development Indicators (SDIs), which were developed through internal consultation. SDIs will be used as the standard, quantifiable performance measures that track Hydro's achievements and shortcomings in the many areas of our business that bear on sustainable energy development.

Through this public reporting process, which will employ consistent, objective and widely understandable measurements of Hydro's performance, we intend to establish for ourselves – and promote to others – ever-higher standards of what we must all do to realize the many benefits of electrical energy while minimizing our effect on the air, water and land on which all life has, does, and will depend.



Maurice F. Strong
Chairman



Dr. Allan Kupcis
President & CEO

1994 Highlights

General Highlights

Environmental Expenditures. Environmental expenditures were estimated at $331 million, which included $94 million associated with improving internal and customer energy efficiency. Environmental spending, excluding energy efficiency costs, declined by 47 per cent from 1993 levels. This drop was largely due to reduced overall corporate spending and completion of the Lambton Generating Station scrubbers project.

Environmental Audits. Nine compliance audits and one environmental performance assessment were conducted by Ontario Hydro's business units. Corrective action plans with schedules to address all identified deficiencies were either completed or in development by year's end.

Contaminated Real Estate/ESA Program. A corporate guideline for Phase I Environmental Site Assessments (ESAs) was prepared. Forty-five staff received Phase I ESA training.

Pickering Heavy Water Leak. No increase in radiation levels were detected in the vicinity of Pickering Nuclear Division following the heavy water leak into containment on December 10. Effective operation of the containment system prevented a release to the environment.

Spills Management. There were 395 chemical and oil spills in 1994, three of which were significant. The total number of spills was 7 per cent less than the 427 in 1993 and 23 per cent less than the 512 spills in 1992.

Coal Ash Re-use. Ontario Hydro produced 552,000 tonnes of coal ash. The target for coal combustion by-products utilization is 25 per cent, increasing to 50 per cent by the year 2000. In 1994, a 36 per cent utilization rate was achieved, up slightly from the 35 per cent level reached in 1993.

FCA Progress. A draft Full Cost Accounting (FCA) Strategy, which describes the corporation's approach to developing and implementing FCA within Ontario Hydro, was under development.

Business Case Summaries. Sustainable Energy Development Decision Criteria were developed and the SED implications of eight Business Case Summaries (BCS) were reviewed. All but one addressed the criteria appropriately and were recommended for senior management approval. The other BCS was withdrawn.

Non-Utility Generation (NUG). Fourteen NUG projects, totalling 229 MW, were placed in service in 1994, including seven load-displacement NUGs totalling 58 MW. Six of these were hydroelectric and eight were natural gas-fuelled cogeneration. Ontario Hydro purchased 4,994 GWh of energy from thermal NUGs at a cost of $281 million.

Stakeholder Involvement. Ontario's Energy Efficiency Consortium, of which Ontario Hydro is a member, produced its report *Accelerating Energy Efficiency in Ontario* in October. The initiatives launched by the Consortium will continue through the creation of a federally incorporated not-for-profit corporation – the Energy Efficiency Alliance.

Aboriginal Initiatives. Ontario Hydro continued to conduct consensus-seeking joint processes with First Nations to resolve their grievances regarding previous Hydro developments. In addition, Hydro established ongoing consultation processes with a number of the major Aboriginal groups in the province.

Corporate Citizenship Program. A total of $85,000 was awarded to four sustainable development-related projects of non-profit organizations by Ontario Hydro's new Corporate Citizenship Program, initiated late in 1994.

Clean Air Challenge. Ontario Hydro won a challenge from B.C. Hydro on the Clean Air Commute with a 75 per cent participation rate. Employees were encouraged to bike, walk, carpool, or take public transit to work on Clean Air Day, June 22, to promote the reduction of air pollution. Ontario Hydro distributed tree seedlings to its participants and received an award from Pollution Probe for its efforts.

Award-winning Report. Hydro's *1993 Environmental Performance Report* received a gold award from the *Financial Post* for environmental reporting in the utilities category.

Ontario Hydro International Incorporated (OHII). OHII issued its *Sustainable Energy Development Approach,* which set out its SED-related principles, operating framework, performance measures, project screening criteria and performance reporting and auditing processes. OHII has committed to promoting sustainable energy development principles in all activities it markets around the world.

International Partnerships. The Global Energy Efficiency Collaborative was formed by Ontario Hydro and the Earth Council to help accelerate global energy efficiency efforts.

Targets and Standards

Ontario Hydro must comply with all legislation and by-laws regarding the environmental aspects related to the construction and operation of all its facilities. In addition to these regulatory requirements, however, the corporation has established its own targets and standards, which often go beyond legislated standards.

The following summarizes Hydro's performance in complying with legislation and regulations and in meeting self-imposed corporate standards. Further detail can be found within the main body of this report.

Regulatory Requirements

Acid Gas Management. Fossil Business Unit acid gas emissions were 136,000 tonnes – 106,000 tonnes of SO_2 and 29,500 tonnes of NO_x. This was 79,000 tonnes below the regulatory limit of 215,000 tonnes, and 4,600 tonnes more than that produced in 1993. Continuous monitoring of SO_2 around fossil generating stations measured no instances in 139,361 monitoring-hours where the regulated ambient air quality criteria limits were exceeded.

Fugitive Emissions. The monthly ambient air quality for dustfall was exceeded in 29 out of 264 samples at Nanticoke and Lakeview Generating Stations. The same criterion for suspended particulate matter was exceeded in 5 of 273 samples. Corrective actions are being taken.

Chemical Emissions. There were no recorded instances of point of impingement standards or ambient air quality criteria for H_2S or SO_2 being exceeded in the vicinity of Bruce Nuclear Power Development.

Environmental Convictions. There was one environmental conviction. An Offence Notice was served to the Grid System Business Unit for failing to comply with a reporting condition in a Certificate of Approval for an oil spill containment system. Ontario Hydro paid a fine of $305.

Corporate Standards & Performance Measures

Greenhouse Gas Management. A corporate *Strategy to Manage Greenhouse Gas Emissions* was prepared by the Fossil Business Unit in conjunction with internal and external stakeholders as one of 1994's Corporate Performance Measures and was approved for submission to the January, 1995 Board of Directors meeting. The strategy matches or exceeds Canada's international commitments under the Framework Convention on Climate Change.

Ozone-Depleting Substances. Preliminary results indicate that Ontario Hydro emitted 31.1 Mg ozone-depleting potential equivalents (ODP-eq), which bettered the 1994 Corporate Performance Measure target of 32.8 Mg ODP-eq. As well, a corporate Ozone-Depleting Substances Strategy was approved. Ontario Hydro Nuclear eliminated 80 per cent of all corporate emissions of ozone-depleting substances by converting dry-cleaning facilities to wet washing or using an alternative solvent.

Renewable Energy Technologies (RETs) Strategy. After discussions with internal and external stakeholders, the RETs Strategy and Program, which meets the 1994 Corporate Performance Measure target, was approved by Ontario Hydro's Board of Directors. Stage I, which will run from 1995 to 2000, is budgeted for $110 million in new funding.

Environmental Management System (EMS). As one of the 1994 Corporate Performance Measure targets, a corporate Environmental Management System framework was developed and accepted by senior management. Business Unit EMS models were in various stages of development at year end.

Customer Energy Management. Through energy management programs, Ontario Hydro customers saved 1,849 GWh of demand (exceeding the 1994 CPM target of 900 GWh) and shifted 27 MW of demand to off-peak periods.

Internal Energy Efficiency. The Internal Energy Efficiency Group was established to provide a dedicated focus for corporate-wide internal energy savings initiatives. Actual savings of 292 GWh were achieved, as compared to the 1994 CPM target of 175 GWh.

PCB Management. The mobile processing units (MPUs) visited 3 sites and processed 597,403 litres of low-level PCB-contaminated oil. Since the program began in 1989, a total of 5,686,341 litres of oil (98 per cent of the target) have been decontaminated.

Radioactive Emissions to Air and Water. All nuclear stations and associated facilities bettered the operating standard that public radiological emission impact be no more than 0.025 mSv/year/facility from all emission pathways to air and water.

Interim Drinking Water Objective for Tritium. On December 22, the Minister of Environment and Energy (MOEE) announced the new interim Ontario Drinking Water Objective for tritium of 7,000 Becquerels/litre. Ontario Hydro's corporate standard is to keep performance at or below 100 Bq/L on an annual average basis as measured at water treatment plants near nuclear stations, and to report this information publicly. Such tritium concentrations have been below 100 Bq/L over the past ten years.

Conventional Waste Inventories. The 1994 Corporate Performance Measure target was not met because waste inventories were not conducted in all business units. A review of conventional waste management systems in the corporation indicated that some business units will need additional effort in this area.

Low-level Solid Radioactive Waste. 5,166 cubic metres of low-level solid radioactive waste resulted from nuclear operations, bettering the target of 5,520 cubic metres.

Herbicide Reduction. Ontario Hydro applied 34,881 kilograms of herbicide to incompatible vegetation, which was well below the corporate target of 84,610 kg.


SUSTAINABLE
energy
DEVELOPMENT

Striving for Sustainable Energy Development (SED)

SED TASK FORCE REPORT

The Board of Directors approved a decision process for moving forward with the 98 recommendations in the *Strategy for Sustainable Energy Development and Use for Ontario Hydro* report issued by the Task Force on Sustainable Energy Development in October, 1993. As of the end of 1994, 14 recommendations had been implemented, 19 more were approved, 6 were declined or deferred and 59 were under review or in development. For more details, refer to the summary table of SED recommendations in Appendix A.

SED is promoted through various people and groups within Ontario Hydro. As recommended in the SED Task Force Report, the President/CEO is designated as the Chief Sustainable Development Officer and the head of each business unit is designated as the Senior Sustainable Development Officer. Environment & Sustainable Development Division (ESDD) provides advice on SED issues to the President/CEO. The SED Advisory Group, comprising representatives from each of the business units, provides advice to ESDD and to senior officers of the corporation. Certain SED recommendations requiring Board approval are reviewed first by the Environment/Health and Safety Committee of the Board.

Pillars of Sustainable Energy Development

The 10-point SED strategy recommended by the Task Force in 1993 has been consolidated into five pillars of sustainable energy development that support Hydro's commitment to this goal:

1. **Continuously improving environmental performance**
2. **Promoting energy and resource use efficiency**
3. **Increasing use of renewable energy**
4. **Integrating environment into business decisions**
5. **Social integrity**

Sustainable Development Indicators (SDIs) - Monitoring and Reporting Framework

A key recommendation of the SED Task Force Report called for the development and use of a Sustainable Development Indicator (SDI) monitoring and reporting framework to measure Hydro's annual progress in attaining its mission. A framework consisting of 31 micro-indicators (see Appendix B), which span the five pillars of SED, was developed in 1994 and approved by the Board of Directors.

The SDI framework is both comprehensive in its measures and applicable across all business units. This detailed measurement and reporting will increase awareness and understanding of how the environmental, economic and social dimensions of daily business practices across the corporation are connected. Use of the framework along with an ongoing process of benchmarking will ensure that performance objectives used by the Corporation are relevant and challenging, as part of Ontario Hydro's commitment to continuous improvement and leadership in sustainable development.

Introduced in 1994, Corporate Performance Measures (CPMs), aligned with the Corporate Mission, highlight corporate and business unit initiatives in four key areas: customers, stewardship, employees and financial. CPMs and performance contracts with key staff will be supported by the SDI framework as additional experience is gained in assessing the sustainability of Hydro's programs and operations.

During 1995, the SDI framework will be assessed using 1994 performance data. The SDI reporting framework will form the basis for assessing and reporting publicly on corporate and business unit SED performance, beginning with 1995 as the baseline. Accordingly, the *1995 Sustainable Development Indicators Report* will replace this current report – the *Sustainable Development/Environmental Performance Report.*



SED Policy and Governing Principles

Ontario Hydro will increase its competitiveness and promote a more sustainable energy future by focusing on the efficient use of resources, continuous improvement in environmental performance and diversification of its energy services and products. To apply the principles of sustainable development throughout its businesses, Ontario Hydro will:

1. Practice eco-efficiency by continuously adding value to products and services, while constantly reducing energy use, material use, pollution and waste.

2. Apply the "precautionary principle" with respect to the human health risks and environmental damage resulting from its activities and will take all cost-effective measures, even where scientific consensus has not yet been established on the level of risk or damage.

3. Integrate environmental and social factors into its planning, decision-making and business practices.

4. Participate in the development of public policy and programs which promote sustainable development, through business, government, non-government and educational initiatives.

5. Work in partnership with stakeholders to promote business decisions and practices which will move towards sustainable development.

6. Educate, encourage and empower its employees to conduct their activities in an environmentally-responsible and sustainable manner.

7. Monitor progress towards achieving sustainable development using measurable indicators and report regularly to all stakeholders.

Five Pillars of SED

1.0 Continuously Improving Environmental Performance

Ontario Hydro's environmental

performance is improved by reducing the releases (emissions, effluents and wastes) resulting from operational and administrative activities. Releases, although not equivalent to environmental impact, are manageable, measurable and can be reduced through pollution prevention programs, best management practices and process optimizations.

1.1 Programs

1.1.1 Environmental Management System

Objective

To meet the 1994 Corporate Performance Measure target to develop a corporate Environmental Management System (EMS) framework and to develop Business Unit EMS models using the corporate framework as a guideline.

1994 Results/Initiatives

- A corporate Environmental Management System framework was developed and accepted by senior management. Business Unit EMS models were in various stages of development at year end.

EMS Framework Definitions

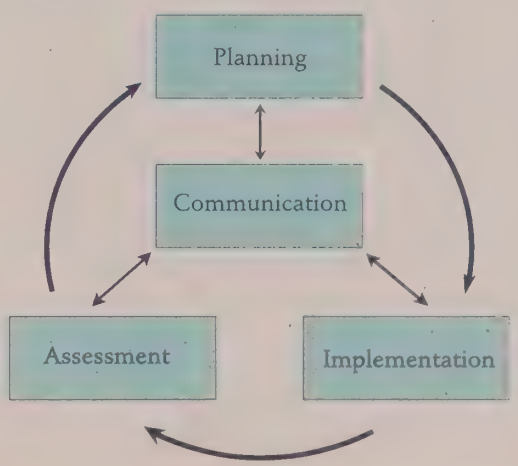
Planning
The definition of accountability, strategies, performance requirements and programs for the management of environmental issues and associated risks consistent with corporate direction and considering stakeholder needs.

Implementation
The carrying out of decisions made in the planning process using knowledgeable employees, appropriate tools and equipment, procedures and information.

Assessment
Verification through monitoring, audits, corrective actions and reporting that environmental performance meets defined requirements.

Communication
Involvement of employees, customers and other external stakeholders, through consultation and information exchange, to ensure integration of environmental considerations into decision making. Communication is essential for an environmental management system to be effective.

Corporate EMS Framework



1.1.2 ENVIRONMENTAL AUDITS

Objective

To determine compliance with environmental legislative and corporate requirements and best management practices.

1994 Results/Initiatives

- Compliance audits were conducted at four Fossil Business Unit (FBU) facilities and audit reports and associated corrective action plans have been prepared for all four. The FBU maintains a three-year audit cycle for its facilities.

- One environmental performance assessment was completed in the Hydroelectric Business Unit. The assessment follows the same methodology, format and protocols as environmental audits, except that the audit team is comprised of staff from within the business unit. An action plan to address the results of the assessment is being prepared; some corrective actions have been initiated.

- The Retail System Business Unit developed and adopted an environmental audit process that calls for independent (i.e., by auditors from outside their business unit) and professional audits of each of its area utilities on a three-year cycle. One retail utility was audited and preparation of the corrective action plan was underway at year end.

- The Grid System Business Unit conducted two environmental audits. Corrective action plans to address the findings will be prepared in 1995. The Grid's environmental audit program will continue on a five-year cycle for all facilities and projects.

- Ontario Hydro Nuclear (OHN) conducted two compliance audits. This completed the second cycle of audits in all field divisions. The audit frequency for the field divisions is on a three-year cycle. OHN's tracking system for environmental audit deficiencies identified that, as of year end, corrective actions for 93 per cent of all deficiencies have been completed.

- On behalf of the President, Environment & Sustainable Development Division established a capability and initiated programs to:
  - conduct compliance, environmental management system and sustainable energy development audits at the corporate level;
  - establish training and qualification standards for environmental auditors;
  - ensure that these principles and standards are met and maintained consistently throughout the corporation; and
  - provide an auditing service to the business units.

1.1.3 CONTAMINATED REAL ESTATE/ENVIRONMENTAL SITE ASSESSMENT (ESA) PROGRAM

Objectives

To review and amend the draft guidelines for contaminated real estate. To undertake Phase I ESAs for contaminated lands and prepare clean-up schedules by the end of 1998 in all affected business units, and to finalize Phase II and III ESA guidelines for use by the end of 1995.

1994 Results/Initiatives

- Environment & Sustainable Development Division provided comments on the review of draft guidelines for contaminated real estate to Corporate Real Estate Division.

- A corporate guideline for Phase I ESAs was prepared. A Phase I ESA consists of interviews, a records review and a site visit to determine a site's potential for contamination. Three training programs on Phase I ESAs were held for 45 staff from various business units.

- The Retail System Business Unit initiated a pilot site screening study involving four sites to evaluate a method for focusing efforts on higher risk sites.

- The Hydroelectric Business Unit completed screening of its sites and established priorities for Phase I environmental site assessments.

- Ontario Hydro Nuclear established a schedule for Phase I ESAs to be conducted at all sites.

- Introductory (pre-Phase I ESA) surveys were completed at all Grid System Business Unit Districts. Phase I ESAs were initiated at three of the ten Grid districts.

- The Fossil Business Unit identified priorities for conducting assessments of its facilities.

- Corporate Real Estate completed Phase I ESAs on nine surplus buildings.

- Ontario Hydro Technologies confirmed that 18 transformer stations were treated with arsenic trioxide, a soil sterilant applied during the period from 1948 to the mid-1960's. A literature review is underway to identify remediation processes suitable for clean up of arsenic-contaminated sites. Environmental Site Assessments will assist in identifying other potentially contaminated sites.

1.2 Emissions Management

1.2.1 Emissions to Air

1.2.1.1 Acid Gas Management

Objective

To comply with regulations governing the emission of acid gases comprising sulphur dioxide (SO_2) and nitrogen oxides (NO_X) emitted during the burning of fossil fuels.

1994 Results/Initiatives

- Fossil Business Unit acid gas emissions for 1994 were 136,000 tonnes – 106,000 tonnes of SO_2 (6.575 kilotonnes/TWh of gross fossil energy production) and 29,500 tonnes of NO_X (1.826 kilotonnes/TWh of gross fossil energy production). This was 79,000 tonnes below the regulatory limit of 215,000 tonnes, and 4,600 tonnes more than that produced in 1993.

- The Flue Gas Desulphurization (FGD) Facility ("scrubbers") at Lambton Generating Station on Units 3 and 4 operated intermittently during commissioning tests from June to December. During this period SO_2 emissions at Lambton GS were reduced by 11,000 tonnes (assuming a contract guarantee of 90 per cent removal efficiency by the scrubbers). Thus the actual acid gas emissions were 125,000 tonnes, which was 90,000 tonnes below the regulatory limit of 215,000 tonnes.

- The Continuous Emission Rate Monitors (CERM) at Lambton GS on Units 3 and 4 were successfully certified by a consultant in late August and a report was issued to the Ministry of Environment and Energy in early October. Acceptance of CERM for acid gas emission reporting is expected from the Ministry following the successful completion of a calibration drift test.

- Figure 1.2.1.1a shows average sulphur content (per cent) of coal as fired for the period 1982-1994. The increase in sulphur content was due to the burning of regular coal (2.5 per cent sulphur) on scrubbed units at Lambton.

Figure 1.2.1.1a
Average Sulphur Content (%) of Coal as Fired, 1982-1994
% sulphur in coal

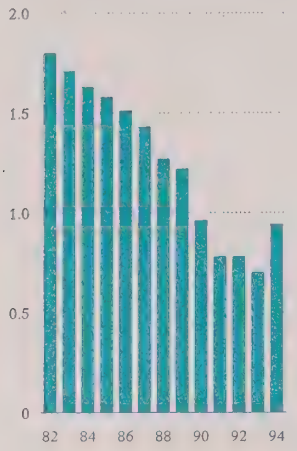


Figure 1.2.1.1b
Ontario Hydro Acid Gas Emissions 1981-1994
tonnes (thousands)

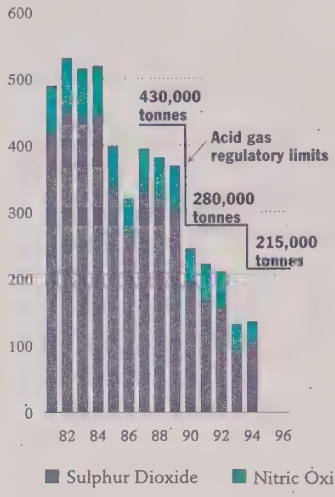
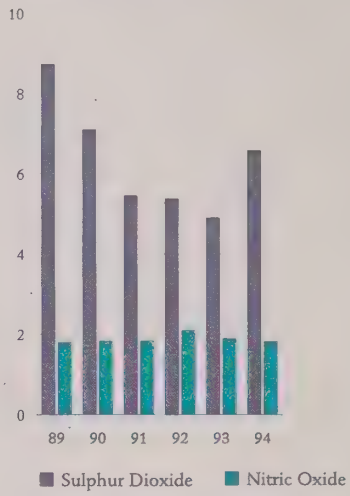


Figure 1.2.1.1c
Acid Gas Emissions Per Unit of Production, 1989-1994
kilotonnes/TWh (gross)



- Figure 1.2.1.1b shows Ontario Hydro acid gas emissions from 1981 to 1994. The increase in SO_2 emissions in 1994 was due to the burning of regular sulphur coal without accounting for FGD (since the CERM monitoring system was not yet approved by the Ministry). With FGD, SO_2 emissions are reduced to 95.2 kilotonnes.

- Figure 1.2.1.1c illustrates acid gas emissions per unit of production, 1989-1994. The acid gas emission rate is higher in 1994 because it has been calculated without accounting for FGD (since the CERM monitoring system was not yet approved by the Ministry). SO_2 emission rate with FGD is 5.9 kilotonnes/TWh.

1.2.1.2. Greenhouse Gas Management

Objective

As part of the 1994 Corporate Performance Measures, to develop a Greenhouse Gas Strategy and to achieve the Greenhouse Gas Emission rate (carbon intensity) target of 0.20 Tg/TWh.

1994 Results/Initiatives

- A corporate *Strategy to Manage Greenhouse Gas Emissions,* prepared by the Fossil Business Unit in conjunction with internal and external stakeholders, was approved for submission to the January, 1995 Board of Directors meeting. The strategy represents Ontario Hydro's contribution to meeting Canada's international commitments under the Framework Convention on Climate Change.

- The Strategy sets two objectives:

  - to reduce the carbon intensity (amount of greenhouse gases emitted per unit of energy) of the useful energy that Ontario Hydro supplies to its customers. Hydro will achieve this by reducing the rate of emission of greenhouse gases per terawatt hour equivalent (Tg/TWh) of useful energy supplied (electricity, heating and cooling energy) by 5 per cent by the year 2000, compared with the baseline 1990 rate. Emissions from non-utility generators (NUGs) and imports are included in this target.

  - to contribute to global emissions reduction. Hydro will achieve this by stabilizing the net greenhouse gas emissions from its *own* operations at 1990 levels by the year 2000 and further reduce emissions 10 per cent by the year 2005. (Emissions from NUGs and imports will *not* be included in this target.)

- The 1994 average greenhouse gas emission rate (CO_2 equivalent) for all energy sources (including imports and NUGs) was about 0.13 Tg/TWh, compared to the target of 0.20 Tg/TWh. There has been a steady decrease in the emission rate since 1990 due to the drop in demand for fossil generation relative to other generation sources.

- Greenhouse gas emissions (CO_2, N_2O, CH_4 and CFCs) were estimated to be 15.3 Tg CO_2 equivalent from all Ontario Hydro sources.

Approximately 98 per cent was from fossil stations. The balance was from reservoirs, combustion turbine units, diesel generators, the vehicle fleet, dry cleaning and refrigerant emissions.

- Emissions of carbon dioxide from fossil stations were 14.82 Tg, down from 19.1 Tg in 1993 (see Figure 1.2.1.2a). This decrease was due to lower use of fossil generation over previous years, due to Ontario's economic downturn. Hydro's emissions represented about 14 per cent of the carbon dioxide emissions in Ontario due to human activity. The average CO_2 emission rate from fossil generation in 1994 was 0.98 Tg/TWh (net) (see Figure 1.2.1.2b).

1.2.1.3 Ground-Level Ozone – NO_x/Volatile Organic Compounds

Objective

To reduce and help prevent ground-level ozone pollution in southern Ontario by reducing Ontario Hydro's nitrogen oxide (NO_x) emissions to less than 38 Gg as NO_x by the year 2000.

1994 Results/Initiatives

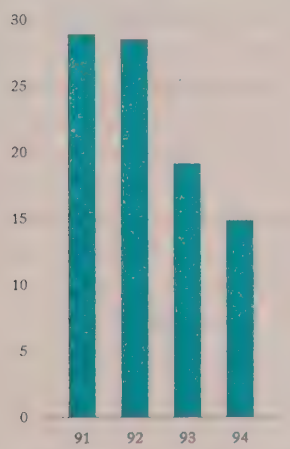
- Ontario Hydro emitted 29.5 Gg of NO_x in 1994, which was below the year 2000 corporate target.
- Ambient levels of ozone and its precursors were measured at two sites during 1994 to determine tropospheric loading in southern Ontario from transboundary flux and the contribution of the Nanticoke Industrial Area to incoming background levels. This information is required for designing an emission/reduction strategy.
- Ontario Hydro performed sensitivity runs of the U.S. EPA Regional Oxidant Model in support of the Windsor-Quebec City Corridor Modelling Working Group of the Canadian Council of Ministers of the Environment (CCME) Multistakeholder NO_x/VOC Science Program Management Group.
- Combustion process modification (CPM) equipment installed on one scrubbed unit at Lambton Generating station is guaranteed by the manufacturer to reduce NO_x emissions by 30 per cent.

1.2.1.4 Emission Reduction Trading

Objective

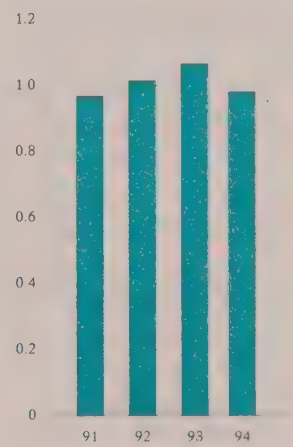
To seek opportunities that demonstrate the practicality and desirability of emission reduction trading in producing environmental *and* economic benefits - together and not as trade-offs.

Figure 1.2.1.2a
Carbon Dioxide Emissions from Fossil Generation, 1991-1994
Teragrams (10^{12} grams)



All emission estimates were re-calculated using more accurate data

Figure 1.2.1.2b
Carbon Dioxide Emissions Per Unit of Production from Fossil Generation, 1991-1994
Teragrams/TWh (net)



1 Teragram = 10^{12} grams

1994 Results/Initiatives

- An Ontario Industry Working Group on NO_x & VOC Emission Reduction Trading (ERT) was formed to develop a proposal on NO_x & VOC ERT for submission to the Ontario Government by the end of 1995. The proposal will consider greenhouse gas offsets. By year end 1994, the work group included participants from more than 20 major businesses and stakeholder groups.

- Preliminary discussions have been undertaken on use of a proposed Ontario Emission Reduction Credit Trading Demonstration Project for a Regional Smog Management Pilot Project being developed between Canada and the U.S. in the Great Lakes Basin.

- Ontario Hydro participated in a pilot study undertaken by Industry Canada to develop a cost/benefit analysis of SO_2 Emission Reduction Trading between Ontario Hydro and Noranda (in Quebec). Results suggested significant cost savings potential, and pointed towards major environmental improvement opportunities in Eastern Canada.

1.2.1.5 Particulate Emissions

Objective

To comply with Ontario Government regulations controlling fugitive emissions and visible emissions (opacity).

1994 Results/Initiatives

Fugitive Emissions

- At Nanticoke Generating Station the monthly ambient air quality criterion for dustfall was exceeded 19 times (out of 156 samples) based on total deposition from all sources. Six of these exceedances were due to the deposition of coal or fly ash (four occurred on-site and two occurred off-site). The other exceedances were due to a combination of fugitive emissions from various sources, i.e., coal dust, fly ash and road dust. The ambient air quality criterion (based on a 24-hour sampling period) for suspended particulate matter was not exceeded (out of 99 samples) based on total deposition from all sources.

- At Lakeview Generating Station the monthly ambient air quality criterion for dustfall was exceeded 10 times (out of 108 samples) based on total deposition from all sources. One of these exceedances was due to the deposition of coal or fly ash which occurred on-site. The other exceedances were due to a combination of fugitive emissions from various sources. The ambient air quality criterion (based on a 24-hour sampling period) for suspended particulate matter was exceeded 5 times (out of 174 samples). One of these exceedances, which occurred on-site, was due to deposition of coal or fly ash.

Visible Emissions (Opacity)

- Fossil stations exceeded 20 per cent opacity (averaged over 4 minutes) for 0.8 per cent of operating time in 1994. The regulation permits 4 minutes (in the aggregate) in any 30-minute period where the opacity may measure 20-40 per cent.

- Figure 1.2.1.5 shows performance from 1989 to 1994. After four years of improvement from 1990 to 1993, there was a slight increase for 1994.

1.2.1.6 Chemical Emissions to Air

Objective

To operate Ontario Hydro facilities in a manner that complies with regulations and guidelines for chemical emissions.

1994 Results/Initiatives

- Continuous monitoring of SO_2 around fossil generating stations measured no instances in 139,361 monitoring-hours where the regulated ambient air quality criteria limits were exceeded.

- Emissions from the Bruce Nuclear Power Development Waste Volume Reduction Facility (WVRF), characterized in 1992, were below Ministry of Environment and Energy point-of-impingement standards and interim standards. Maximum in-stack concentrations of total suspended particulate and PCDD/PCDF exceeded guidelines for municipal solid waste incinerators published by the Canadian Council of Ministers of the Environment. A program was initiated to reduce PCDD/PCDF emissions at the WVRF.

Figure 1.2.1.5
Opacity
% of time opacity limit exceeded

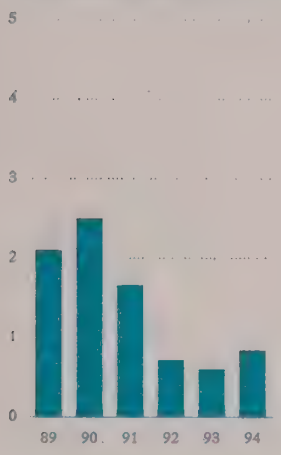
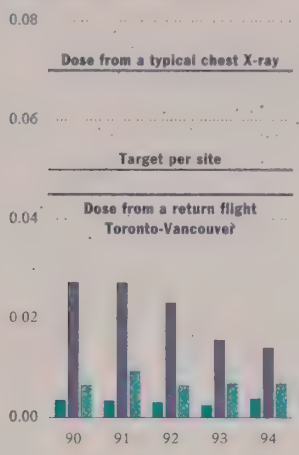


Figure 1.2.1.7
Public Dose Impact at Ontario Hydro Nuclear Sites
site boundary public dose (mSv)



- Darlington site
- Pickering site
- Bruce site

- Long-term average public dose in Ontario from natural background & medical exposures: 3.6 mSv/year
- Canadian public legal dose limit (over and above background) - 5.0 mSv/year
- Boundary dose is an upper limit for doses to an individual from nuclear site emissions

- The report on emission testing at Thunder Bay Generating Station was reviewed and finalized.

- The ambient air monitoring network for H_2S and SO_2 in the vicinity of Bruce Nuclear Power Development (BNPD) continued to operate in 1994. The H_2S and SO_2 concentrations monitored in 1994 were typically well below all standards and criteria. There were no recorded instances of point-of-impingement standards or ambient air quality criteria for H_2S or SO_2 being exceeded in the BNPD environs in 1994.

1.2.1.7 Radioactive Emissions to Air

Objective

To meet Ontario Hydro's operating *target* that radioactive emissions to the air be less than one per cent of the approved Atomic Energy Control Board limits. To meet the *standard* that public radiological emission impact be no more than 0.025 mSv/year/facility from all emission pathways to air and water.

1994 Results/Initiatives

- All nuclear stations and associated facilities bettered the operating target and standard.

- Figure 1.2.1.7 illustrates the public dose impact for all radioactive emissions, including air, from 1990 to 1994. The 1990 and 1991 doses were recalculated using a more accurate dose calculation methodology for comparative/trending purposes.

- No increase in radiation levels was detected in the vicinity of Pickering Nuclear Division following the heavy water leak into containment on December 10. Effective operation of the containment system prevented a release to the environment.

1.2.2 Emissions to Water

1.2.2.1 Municipal/Industrial Strategy for Abatement (MISA)

Objective

To work with the Ministry of Environment and Energy to develop a process effluent limits regulation that will result in cost-effective reductions of water-based contaminants from fossil and nuclear sites.

1994 Results/Initiatives

- The Ministry of Environment and Energy released the draft electric power generating sector MISA effluent limits regulation for a 60-day public review period in December, 1994. The Ontario government is expected to promulgate the regulation in April, 1995. Estimated costs of compliance are $110-145 million in capital costs and $9-14 million/year in operating costs for end-of-pipe treatment equipment. Both the Fossil Business Unit and Ontario Hydro Nuclear are investigating more cost-effective methods of compliance, such as use of best management practices.

1.2.2.2 TRITIATED HEAVY WATER

Objective

To maintain tritium concentration of about 14.9 Ci/kg of heavy water in reactor moderator systems and 1 Ci/kg in reactor heat transport systems.
(1 Ci = 3.7×10^{10} Becquerels)

1994 Results/Initiatives

- The Tritium Removal Facility at Darlington continued to operate to remove tritium from the heat transport and moderator systems. This process affords the dual benefits of reducing worker exposure and reducing potential environmental emissions.

- Approximately 25.5×10^{6} Ci/kg of tritium were extracted from heavy water, immobilized and placed in long-term storage.

- The average heat transport and reactor moderator tritium concentrations (Ci/kg) as of year end are provided in Table 1.2.2.2.

TABLE 1.2.2.2
1994 AVERAGE HEAT TRANSPORT AND REACTOR MODERATOR TRITIUM CONCENTRATION

Station	Heat Transport (Ci/kg)	Reactor Moderator (Ci/kg)
Pickering A	1.4	12.5
Pickering B	1.2	14
Bruce A	1.8	15.5
Bruce B	0.81	14.7
Darlington	0.62	8

1.2.2.3 RADIOACTIVE EFFLUENTS TO WATER

Objective

To meet Ontario Hydro's operating *target* that radioactive emissions to water be less than one per cent of the approved Atomic Energy Control Board limits; to meet a more restrictive operating *standard* that public radiological emission impacts be no more than 0.025 mSv/year/facility from all emission pathways to air and water.

1994 Results/Initiatives

- All nuclear generating stations and associated facilities bettered the operating target and standard.

- Figure 1.2.1.7 shows the public dose impact for all radioactive effluents, including water, from 1990 to 1994. The 1990 and 1991 doses were recalculated using a more accurate dose calculation methodology for comparative/trending purposes.

INTERIM ONTARIO DRINKING WATER OBJECTIVE FOR TRITIUM

On December 22, 1994, the Minister of Environment and Energy announced the new interim Ontario Drinking Water Objective for tritium of 7,000 Becquerels/litre, down from 40,000 Bq/L; and in line with the level recommended by the World Health Organization in 1993. Ontario Hydro committed to the MOEE to operate its facilities so as to keep performance at or below 100 Bq/L on an annual average basis as measured at water treatment plants near nuclear generating stations, and to report this information publicly. Tritium concentrations at water treatment plants near nuclear stations have been below this level over the past ten years.

1.2.3 SPILLS MANAGEMENT

Objective

To reduce the number of spills and improve spills management for public and employee safety and environmental protection.

1994 Results/Initiatives

- There were 395 spills reported in 1994, down 7 per cent from the 427 spills in 1993 and down 23 per cent from the 512 spills in 1992. Table 1.2.3 provides details of 1993 and 1994 spills.

Table 1.2.3 Reported Spills: 1993 - 1994

Parameter	Spills (Number)		Volume Spilled (Litres)		Volume Recovered (Litres)		Percent Lost to Environment	
	1993	1994	1993	1994	1993	1994	1993	1994
PCB/Askarel/PCB-Contaminated Oils & Compounds								
Grid	17	14	62	182	62	180	0	1
Retail	20	18	380	483	358	468	6	3
Nuclear	0	1	0	113	0	113	0	0
Business Services	0	1	0	0.5	0	0.5	0	0
Oils (Lubricants, Hydraulic, Insulating, etc)								
Grid	28	25	294566	15417	264731	11908	10	23
Hydroelectric	6	11	2510	2930	1288	337	49	88
Retail	287	254	6400	10673	4985	6679	22	37
Fossil	9	10	23	6070	23	4576	0	25
Nuclear	8	5	20001	65	8943	5	55	92
OHT	0	1	0	5	0	5	0	0
Fuel Oil/Diesel Oil								
Grid	1	1	454	20	300	20	34	0
Hydroelectric	0	2	0	110	0	0	0	100
Retail	12	17	4356	14354	767	5777	82	60
Fossil	6	0	8169	0	7954	0	3	0
Nuclear	1	4	362	325	362	315	0	3
Chemicals								
Hydroelectric	0	1	0	2000	0	0	0	100
Retail	3	0	238	0	13	0	95	0
Fossil	3	1	1067	409	773	364	28	11
Nuclear	5	7	460	6615	104	1629	77	75
OHT	0	1	0	450	0	0	0	100
Sewage								
Fossil	0	3	0	4765	0	2115	0	56
Nuclear	3	1	9500	unknown	500	0	95	100
Contaminated Water								
Fossil	2	5	205	1.9×10^6	0	380000	100	80
Nuclear	12	1	41504	250	243	0	99.4	100
Spills to Air								
Grid	2	4	599	1386 kg	0	0	100	100
Hydroelectric	0	2	0	17 m^3	0	2 m^3	0	88
Fossil	0	3	0	n/a	0	n/a	0	100
Nuclear	2	2	1893	53	0	0	100	100

Notes:
n/a = not applicable

Classification of spilled material:
PCB - PCB/Askarel/PCB-contaminated oils and compounds.
Oils - lubricants, hydraulic fluids, cutting fluid, transformer oil, transmission oil, motor oil.
Fuels - fuel oil, diesel oil, gasoline, ignition oil, bunker oil, CTU oil, kerosene.
Chemicals - for example, herbicides, ethylene glycol, ammonia.
Sewage - for example, releases from sewage lagoons or septic systems.
Contaminated Water - any water-based release containing non-process contaminants such as soil, coal dust, fly ash or dilute chemicals.
Spills to Air - includes releases to the atmosphere, such as freon, halon and coal dust.

- The Environment/Health and Safety Committee of the Board of Directors requested an analysis of 1993 spills. The report, presented to the committee in June, 1994, included 14 action items. Eight actions were completed and the balance were underway as of year end.

- There were three significant spills in 1994. Transformer oil was spilled to the St. Clair River and two diesel fuel spills occurred at remote diesel generating stations in northern Ontario. Corrective actions have either been implemented or are underway.

- Spill Risk Assessments have been conducted at all operating Fossil Business Unit sites.

- Approximately 500 Retail System Business Unit staff received training in spills awareness and reporting and an additional 325 received practical spills training.

- The Hydroelectric Business Unit installed transformer oil spill containment and detection equipment at selected facilities. Development of an oil containment strategy and action plan was initiated based on a risk management approach, which takes into account probable consequences and practical means for prevention. A number of transformers were replaced by air-cooled ones to mitigate potential oil spill concerns.

- The Grid System Business Unit installed transformer spill containment/monitoring systems at seven transformer stations.

- Ontario Hydro Nuclear initiated a spills assessment program.

1.2.4 TOXIC SUBSTANCE MANAGEMENT

Objective

To ensure that priorities among toxic substances are established, alternatives fully evaluated and implications regarding Ontario Hydro's operations are identified, in support of government initiatives to achieve reductions or eliminations in the release of toxic substances into the environment.

1994 Results/Initiatives

- Ontario Hydro established a committee to address pollution prevention. The program takes a holistic approach to the issue, respecting the objectives of Federal/Provincial programs such as Accelerated Reduction/Elimination of Toxics (ARET) and National Pollutant Release Inventory (NPRI).

- In November, 1994, Hydro submitted its *Accelerated Reduction or Elimination of Toxics* Action Plan to the ARET Secretariat. The initial priorities of the ARET action plan are to generate an inventory in order to develop a database of emissions, hazardous waste production and procurement information. This will lay the groundwork for establishing reduction targets in key areas where accelerated reductions are achievable and practical.

- Hydro submitted NPRI reports as required in 1994. The substances reported included hydrazine, copper, sulphuric acid and ammonia.

1.2.4.1 PCB MANAGEMENT

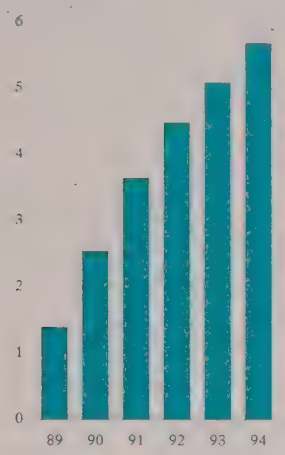
- Retrofill/Decontamination Program: In 1994, the mobile processing units (MPUs) visited 3 sites and processed 597,403 litres of low-level polychlorinated biphenyl (PCB)-contaminated oil. Since the program began in 1989, a total of 5,686,341 litres of oil (98 per cent of the target) have been decontaminated. Figure 1.2.4.1 illustrates the historical accomplishments of the program.

- Station Capacitor Bank Program: Six capacitor banks comprising 1,512 capacitors were replaced in 1994 with non-PCB equipment (14,263 capacitors remained in service at year end).

- Approval was granted by the Ministry of Environment and Energy for the destruction of highly contaminated liquid PCB wastes using a low-temperature chemical process developed by Ontario Hydro Technologies. A mobile system for carrying out a commercial venture of this technology is planned for 1995.

- Ontario Hydro Technologies conducted pilot scale studies of a low-temperature chemical process for the dechlorination (decontamination) of PCB in soils. Soils contaminated with PCB to a level of up to

Figure 1.2.4.1
Cumulative PCB Decontamination
millions of litres



(Insulating oil low-level PCB)



Ontario Hydro's total emissions of ozone-depleting substances were reduced by 80 per cent by eliminating CFC-113 from dry cleaning of radiological protective clothing.

1,000 ppm were successfully decontaminated to a level of less than 5 ppm.

- Ontario Hydro facilitated discussions between the Ontario PCB Owners Group and Environment Canada regarding decommissioning and destruction targets contained in the Canada-Ontario Agreement and the impact on the corporation and other PCB owners. The targets call for the decommissioning of 90 per cent of Ontario's high-level PCBs in use by the year 2000, and the destruction of 50 per cent of high-level PCBs in storage as of July 1994 by the year 2000. Discussions are continuing with both federal and provincial governments concerning agreeable targets, available destruction technologies and related matters.

1.2.4.2 Ozone-Depleting Substances

Objective

To meet the 1994 Corporate Performance Measure emission target of 32.8 Mg ozone-depleting potential equivalents (ODP-eq), in support of Canada's position on the chlorofluorocarbons (CFCs) phase-out schedule established in November, 1992 for all signatory countries of the Montreal Protocol.

1994 Results/Initiatives

- Preliminary results indicate that Ontario Hydro emitted 31.1 Mg ODP-eq, which slightly bettered the Corporate Performance Measure target of 32.8 Mg ODP-eq.

- A corporate Ozone-Depleting Substances (ODS) Strategy was approved in 1994 with these objectives:

  - to introduce alternative cleaning agents to replace ozone-depleting solvents;
  - to contain emissions from air conditioning equipment at near zero;
  - to replace halons used in fixed and portable systems with substances containing no ozone-depleting constituents; and
  - to remove or replace all CFCs from chillers.

- By year end Ontario Hydro Nuclear (OHN) had eliminated 80 per cent of the corporate emissions of ozone-depleting substances by converting dry-cleaning facilities to wet washing. This conversion eliminated CFC-113 from the process of cleaning radiological protective clothing and decontaminating equipment, meeting both corporate and OHN targets.

  Perchloroethylene (PERC), the solvent used by most private dry-cleaning businesses, is now being used by OHN as it does not deplete ozone. In 1994, 35,000 kg of CFC-113 were used. New monitoring programs will divert 94 per cent of annual dry-cleaning loads to wet wash and Darlington Nuclear Division has eliminated dry cleaning altogether. It is estimated that only 1000 kg of PERC will be required each year.

- Other measures employed by Ontario Hydro to reduce ODS emissions include:
  - A large number of portable halon fire extinguishers were replaced with CO_2 and dry chemical units.
  - An R-11 chiller was replaced with one that operates on R-22, a non-CFC refrigerant.
  - New vehicle purchases now specify ODS-free air conditioners. As well, a pilot project to evaluate replacement refrigerants for existing vehicles was started. A non-CFC drop-in replacement for R-12 refrigerant was successfully used on a trial basis in the vehicle air conditioning systems of 10 heavy equipment vehicles.
  - Staff handling CFCs were trained in refrigerant recovery techniques and obtained provincial certification as required under the "Refrigerants" Regulation.

1.2.4.3 MERCURY

- A report was issued documenting the development of a method for speciating mercury in stack emissions, as well as the results of measurements from field studies undertaken at Lakeview and Nanticoke Generating Stations using the method. This method is now being used in several external studies to determine the chemical form of mercury emitted from U.S. power plants.

- Sediment cores from deep depositional areas of four Ontario Hydro reservoirs were examined to determine the changes in mercury and organic profiles with reservoir development. The rate of mercury and organic accumulation appeared to increase with reservoir impoundment, although consistent changes in concentrations were not found. These results agree with earlier studies, which indicated that an increase in mercury supply caused by erosion and release from flooded soils is central to the changes in mercury dynamics within reservoirs following impoundment.

- The Experimental Lakes Area Reservoir Project (ELARP) in northwestern Ontario confirmed the importance of flooding of wetlands in mercury cycling, methylation and contamination of reservoirs. Drawdown of the reservoir during the winter of 1993/94 resulted in downstream transport of methyl mercury, which was replaced in the reservoir by further methylation after the shallow reservoir became anoxic. The five-year study, which Ontario Hydro is jointly conducting with government, universities and other utilities, will be completed in 1995.

1.2.4.4 WOOD POLE PRESERVATIVES

- During 1994, distribution line construction (both new and upgrades) was reduced relative to levels in recent years. The inventory of poles accumulated in previous years was used to supply most of this construction. About a third of these poles were treated with copper-chromium-arsenic, an environmentally preferred alternative to pentachlorophenol. Groundline re-treatment of in-service poles with penta-chlorophenol was again not practised in 1994.

- Alternative groundline re-treatment using copper naphthenate as the preservative was initiated on some transmission line poles.

1.2.5 COMPLIANCE

1.2.5.1 ENVIRONMENTAL CHARGES AND CONVICTIONS

Objective

To comply with all applicable environmental statutes and regulations and meet the Corporate Performance Measure target of zero environmental convictions.

1994 Results/Initiatives

There was one environmental conviction in 1994, which exceeded the CPM target of zero. An Offence Notice was served to the Grid System Business Unit for failing to comply with a reporting condition in a Certificate of Approval for an oil spill containment system. Ontario Hydro paid a fine of $305.

1.2.5.2 COMPLAINTS

Objective

To minimize any concerns arising from the operation of Ontario Hydro facilities and deal expeditiously with any complaints.

1994 Results/Initiatives

- High winds on February 23 resulted in several dust complaints to Lakeview Generating Station. These complaints were classified as a single incident. Lakeview GS has been, and is continuing to, evaluate and take corrective actions to reduce fugitive emissions.

  There was one complaint to Nanticoke Generating Station regarding dust deposited on neighbouring property in June. The follow-up analysis was inconclusive as to origin of the dust. The station is presently evaluating fugitive emissions in the area of the complaint.

  There were two dust complaints to Lambton Generating Station. Lambton GS is reviewing their dust suppression procedures.

- There were six other complaints received by the Fossil Business Unit: three stack emission (e.g., visible smoke) complaints (two at Nanticoke GS and one at Lambton GS); two noise complaints at Nanticoke GS, which were related to the induced draught fans; and one light complaint at Lambton GS, which was related to the high intensity of the lower strobe light on the stack.

- There were two valid odour incidents recorded at Bruce Nuclear Power Development. The exact cause of the odour could not be determined for either incident.

1.3 Waste Management

1.3.1 Conventional Waste Audits

Objective

To meet the 1994 Corporate Performance Measure target to complete conventional waste audits in each business unit, with the overall aim to reduce waste produced by 50 per cent by the year 2000.

1994 Results/Initiatives

- A review of conventional waste management systems in the corporation was completed. Four business units completed waste audits either during 1994 or prior to 1994. Additional effort is planned in 1995 in this area to establish baseline data.

1.3.2 3Rs – Reduce, Reuse, Recycle

Objective

To expand waste management initiatives to all Hydro operating facilities as a means of working towards the goals of the *Ontario Waste Management Act,* using the 3Rs approach.

1994 Results/Initiatives

- The 3Rs are integrated into Hydro's way of business. At the facility level, 3Rs apply to fine paper, cardboard, metal cans, wood, scrap metal, plastics, motor and insulating oils, antifreeze, toner cartridges, work gloves, batteries and light ballasts. The major recovery point for surplus materials is located at the Kipling Waste Transfer Facility in Etobicoke.



Investment Recovery Services at Hydro's Kipling Waste Transfer Facility realized a total sales volume of $27 million in 1994 from the sale of scrap metals and surplus materials and equipment.



"Second Hand Rose's Store", initiated by David Malone and Rose-Mary Matusiak, provides a depot for the reuse of stationery and equipment within Head Office.

- A "reuse store" was established at Head Office for unwanted but still useful materials such as paper, binders, folders and computer software.

- The Retail System Business Unit established baseline data for the types and volumes of waste going to landfill. Wood utility poles – there are over 3 million province wide – have been the subject of studies by Ontario Hydro, Bell Canada and the municipal utilities. While a change to metal poles reduces post-use waste, wood poles removed from service can be recycled and the preservative (pentachlorophenol) removed, in a process being proposed to Ontario Hydro.

- About 415 tonnes of headpond debris – trees, branches and aquatic vegetation – was removed from Saunders Generating Station. Approximately 378 tonnes (91 per cent) was diverted from landfill. The material was sold for firewood, pulp and paper feedstock and as a natural fuel.

- The Grid System Business Unit determined that a potential reduction of 40-70 per cent of specified waste streams is achievable along with significant cost savings. The Grid's 3Rs strategy, initiated in 1994, will identify site champions and provide advice on setting up a 3Rs program.

- Waste audits conducted at Ontario Hydro Nuclear field locations serve as baselines for waste management programs. For the second consecutive year, OHN achieved more than 50 per cent diversion of potential wastes from landfill.

- In addition to other recycling initiatives, the pilot project for composting fish and zebra mussels at Bruce Nuclear Power Development continued and an estimated 25 tonnes of scrap wood was given to employees for reuse.

- Nanticoke Generating Station initiated a review of alternative handling options for zebra mussel shells. Plans to test their suitability as a soil conditioner were discussed with the Ministry of Agriculture and Food.

Kipling Waste Transfer Facility – Investment Recovery

- The Kipling Waste Transfer Facility handles the majority of the corporation's regulated wastes as well as some non-regulated wastes. The facility tests, recycles, stores and disposes of the waste in bulk to external receiver sites for reclamation, recycling, landfill or incineration. The facility is licensed to receive most regulated wastes. The site is also licensed as a PCB storage and transfer station.

- The facility handled over 500 tonnes of hazardous waste. The PCB inventory was over-packed in new steel drums to maintain environmental security.

- Waste transfer staff reviewed ten industrial waste handling and processing facilities utilized by Ontario Hydro to ensure regulatory compliance.

- Investment Recovery Services at Hydro's Kipling Waste Transfer Facility realized a total sales volume of $27 million in 1994 from the sale of scrap metals and surplus materials and equipment. Revenues of $23 million were returned to the business units.

- Approximately $6 million of surplus items were redeployed to other groups within the corporation resulting in cash flow savings of $50 million.

1.3.3 Radioactive Materials and Wastes

Objective

To manage radioactive materials so as to protect workers, the public and the environment – now and in the future – from hazards associated with these materials.

1994 Results/Initiatives

1.3.3.1 Radioactive Liquid Chemical Waste

- An on-site demonstration was conducted by a private contractor to determine the efficacy of its process in removing the radioactive components in stored oil. The test was successful and additional studies are in progress at Bruce Nuclear Power Development to determine if the process can be part of a disposal option.

- The Spent Solvent Treatment Facility located at the Bruce Nuclear Power Development site successfully treated 3761 m^3 of liquid waste in 1994. The waste was generated as a result of the boiler cleaning projects conducted at Pickering Nuclear Division and Bruce Nuclear Generating Station A.

1.3.3.2 Low- and Intermediate-Level Solid Radioactive Waste

- Ontario Hydro Nuclear continues to meet ever more restrictive targets limiting the amount of low- and intermediate-level solid radioactive waste produced. Furthermore, innovative sorting procedures have postponed the need to expand OHN's low-level waste storage buildings.

- 5,166 cubic metres of low-level solid radioactive waste resulted from nuclear operations, which compared favourably to the target of 5,520 cubic metres.

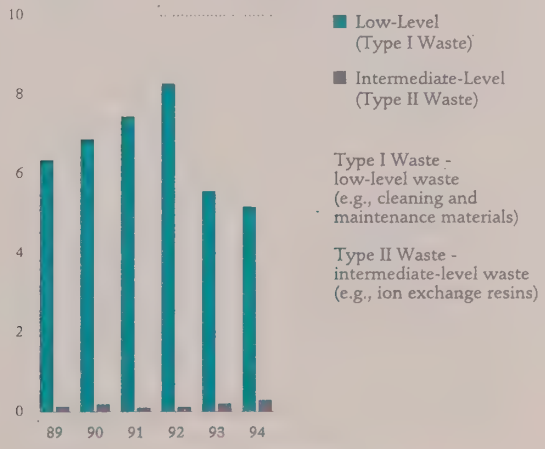
- 294.3 cubic metres of intermediate-level solid radioactive waste was produced. There was no specific target for intermediate-level waste in 1994.

- The 1995 target of 4,872 cubic metres includes low-level and intermediate-level radioactive waste. The year 2000 target of 4008 cubic metres (based on 20 units in operation) is 50 per cent of the 1988 level.

- Re-sorting of low- and intermediate-level radioactive wastes at Ontario Hydro Nuclear's Radioactive Waste Operations Site 2 has deferred anticipated capital costs related to building new facilities and may eliminate the need for them altogether.

Figure 1.3.3.2 shows the solid radioactive waste produced over the last six years.

Figure 1.3.3.2
Solid Radioactive Waste, 1989-1994
waste produced, m^3 x 1000 (thousands)



Includes Ontario Hydro Technologies, Waste Volume Reduction Facility, Bruce Central Maintenance Facility, Darlington Tritium Removal Facility and all Nuclear Stations

1.3.3.3 NUCLEAR USED FUEL

- Hydro's nuclear stations produced approximately 1,550 tonnes of nuclear used fuel in 1994. To date, the stations have produced 18,100 tonnes of used fuel.

- With the assistance of Ontario Hydro, Atomic Energy of Canada Limited (AECL) submitted an Environmental Impact Statement on the used fuel disposal concept to the federal Environmental Assessment (EA) panel. The Canadian disposal concept envisions the immobilization of used fuel in corrosion-resistant titanium containers, followed by disposal in an underground repository (500-1000 metres deep) in the granitic rock of the Canadian Shield. AECL and Ontario Hydro participated in a series of public information open houses, hosted by the Canadian EA Agency. These events will continue into 1995.

1.4 Biodiversity Management

Objective

To operate and manage Ontario Hydro facilities and lands in a manner that ensures the continued existence of native species within a regional context.

1994 Results/Initiatives

- A corporate work group, with membership from several business units, prepared a draft *Strategy to Promote the Conservation of Biological Diversity.* The strategy comprises four broad elements – Stewardship, Life Cycle Management, Partnerships, and Education – and is scheduled to be submitted to the Board of Directors for approval in 1995.

1.4.1 FISH MANAGEMENT

- A total of 99,380 kilograms of fish was impinged at Ontario Hydro Nuclear cooling water intakes. This was within the range of historical variability.

- Environmental Effects monitoring study results at nuclear sites have shown no direct evidence of adverse impact of station fish loss on fish populations.

- The scheduling of Bruce B outages and zebra mussel control injections of sodium hypochlorite are arranged seasonally to avoid the period of smallmouth bass spawning within the discharge channel.

- More than 163,000 eels migrated past Saunders GS to Great Lakes rearing grounds by way of the eel ladder. The eel program is managed in conjunction with the Ministry of Natural Resources.

- Fish rescue programs for the retrofitting of the Seymour Generating Station were successfully completed during the dewatering of the intake and cofferdam. Post-operational monitoring studies on walleye spawning and water quality were conducted at the Big Chute Generating Station during the spring and summer.

- The Grid System Business Unit participated in a joint program with the Couchiching First Nation, Transport Canada and the Ministry of Natural Resources to improve fisheries habitat during project site development.

- In the Fossil Business Unit, a radiotagging project was conducted to examine the effect of station operations on bass nesting and fish behaviour in the outfall channel at Nanticoke GS. No adverse effects were observed.

1.4.2 WILDLIFE MANAGEMENT

- The Retail System Business Unit provided used hydro poles to a conservation authority for osprey nests, and participated in a joint project with the Ministry of Natural Resources and a First Nations group to establish bald eagle nesting platforms.

- Deer-vehicle collision control measures introduced at Bruce Nuclear Power Development in 1992 and 1993 appear to have improved protection of both employees and deer. In 1994, collisions were reduced 30 per cent from the average of the previous 5 years.

- A peregrine falcon nesting box was installed on the rooftop at Wesleyville. A field inventory of critical species and habitats was largely completed for BNPD in 1994.

- The Fossil Business Unit initiated plans to install peregrine falcon nest boxes at all its southern Ontario facilities. Installation should be complete by early 1995.

- A site wildlife and vegetation survey was completed at Nanticoke GS. The survey identified over 100 species of plants on site, in addition to over 148 animal species that use or pass through the site property. The station is developing plans to maintain and enhance the site's biodiversity.

1.4.3 Reforestation

- The Grid System Business Unit planted over 746,500 trees. Of these, Transmission Projects planted 320,000 trees (160 hectares) as part of agreements with First Nations representatives and the Ministry of Natural Resources. Of the Grid total, 425,000 trees on 172 hectares were planted as part of the Lennox GS to Bowmanville TS construction project.

- A Reforestation Partnership Agreement was signed with the Ontario Forestry Association and the Ministry of Natural Resources, as part of the Lennox GS to Bowmanville TS 500 kilovolt tree planting efforts. A minimum of 320,000 tree seedlings are scheduled to be planted in 1995.

- The Retail System Business Unit replaced an estimated 6,000 landscape trees during the year. In addition, over 1,000 seedlings were planted to offset right-of-way clearing for new "cross-country" distribution lines.

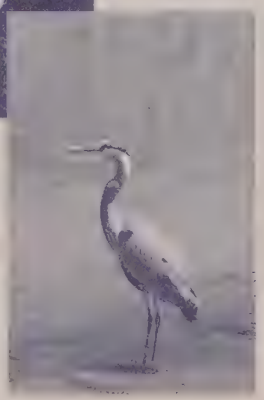
1.4.4 Right-of-Way Management/Herbicide Reduction

- Ontario Hydro applied 34,881 kilograms of herbicide to incompatible vegetation, which was well below the corporate target of 84,610 kg (see Figure 1.4.4). Herbicides are used to selectively control vegetation to keep access trails and control structures clear and to reduce safety risks relating to electrical clearance requirements.

- Preliminary results of an Ontario Hydro Technologies study indicate that carefully selected cover crops can be successfully established on rights-of-way to dominate the vegetation and reduce tree growth. Even in locations where such crop establishment was poor, positive effects were observed. This information can be used at the restoration stage of line construction to produce a ground cover requiring less maintenance in the future.

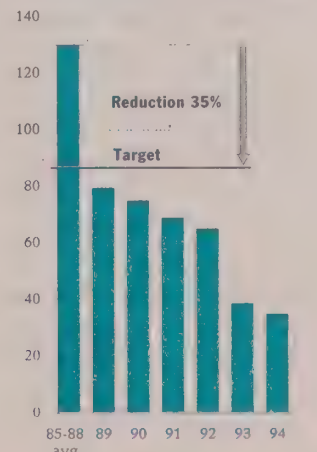


Fish monitoring studies help identify potential impacts of Ontario Hydro's operations on the environment.



The Great Blue Heron – seen here "fishing" in the discharge channel – was one of the many species of wildlife identified during the Nanticoke Generating Station biodiversity survey.

Figure 1.4.4
Herbicide Usage
thousands of kilograms active ingredient



Five Pillars of SED

2.0 Promoting Energy and Resource Use Efficiency

Energy and resource use efficiency is promoted through demand management programs that reduce customer and internal electricity use and through Hydro's industrial ecology programs. These greater efficiencies improve Ontario's overall financial and environmental performance and enhance its global competitiveness.

2.1 Energy Management

Objective

To reduce customer electricity use by 900 GWh and to reduce internal electricity use by 175 GWh, in accordance with 1994 Corporate Performance Measure targets.

1994 Results/Initiatives

Customer Results

- In 1994, targets were exceeded as Ontario Hydro customers saved 1,849 GWh of electricity (see Figure 2.1) and shifted 27 MW of demand through various programs including Accelerated Payback, High Efficiency Motors, Energy-Efficient Lighting, R2000 and Home Power Saver.

- Electrotechnologies such as fans, pumps and compressors benefit customers by improving productivity and increasing energy efficiency by an average of 30 per cent. For example, Ford in Oakville installed energy-efficient compressed air systems; St. Mary's Cement installed a control system incorporating an adjustable speed drive; and Dofasco installed new energy-efficient cooling water pumps.

- Customer retention initiatives allowed Ontario Hydro to retain 2,162 GWh (which exceeded the target of 360 GWh) of energy that would otherwise have been lost as a result of industry closures or relocation outside Ontario.

- Economic development initiatives created 290 GWh (which exceeded the target of 270 GWh) in new load by enticing new/expanding industrial customers to use energy-efficient systems which increase their overall productivity.

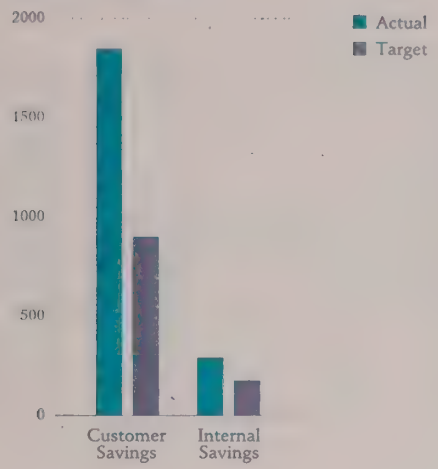
- Ontario Hydro was involved in nine Local Integrated Resource Planning (LIRP) studies in 1994. (See Section 4.4.1 for more details on LIRP).

Internal Results

- The Internal Energy Efficiency group was established in May, 1994 to provide a dedicated focus for corporate-wide internal energy savings initiatives. Targets were exceeded as internal energy savings of 292 GWh were achieved (see Figure 2.1) primarily through the following:

  - Half of the savings resulted from reduced transmission and distribution losses due to installation of new facilities, refurbishments and upgrades.

Figure 2.1
1994 Energy Savings
Gigawatt hours (GWh)





The Nanticoke Generating Station rail car facility was constructed to transport dry fly ash to a cement manufacturer in Michigan. Using ash instead of quarried shale saves money and reduces greenhouse gas emissions.

- One-third of the savings resulted from process and procedure changes implemented at fossil and nuclear generating stations.

The electricity saved is enough to serve a city the size of Owen Sound. These savings are equivalent to about $6 million annual savings in production costs (at an average marginal cost of 2 cents/kWh).

A pilot project involving the conversion of vehicles from gasoline to dual fuel (i.e., gasoline and compressed natural gas) was begun in the Retail System Business Unit. As well, one of the retail utilities installed a waste oil furnace that will both handle a waste stream and reduce electricity consumption.

2.2 Resource Use – Industrial Ecology

Objective

To increase the use of electricity production by-products.

1994 Results/Initiatives

- Ontario Hydro produced 552,000 tonnes of coal ash in 1994. The target for coal combustion by-products utilization is 25 per cent, increasing to 50 per cent by the year 2000. In 1994, a 36 per cent level was achieved. The largest coal fly ash markets were cement manufacturing for Nanticoke and Lakeview Generating Stations, mine backfilling for Thunder Bay and Atikokan Generating Stations and liquid waste stabilization for Lambton Generating Station.

- The 36 per cent utilization rate in 1994 marginally exceeded the 35 per cent level reached in 1993. In 1994, production of gypsum (from the Flue Gas Desulphurization process) started at Lambton Generating Station and about 60,000 tonnes were produced and stockpiled. Shipments of gypsum from Lambton Generating Station to the customer, Westroc Industries, will start in 1995.

- Figures 2.2 a, b, and c show coal ash production, coal ash production per net energy produced and coal ash utilization.

- A rail car ash facility was constructed at Nanticoke Generating Station to transport fly ash to the Lafarge Cement Corporation in Alpena, Michigan for use in the manufacture of cement.

- The Fossil Business Unit sponsored a research study to determine the suitability of clinker (bottom ash) as granular fill in raised leaching beds.

- Darlington Nuclear Division reached an agreement with St. Mary's Cement in which all sludge from its water treatment plant (estimated at 1,300 tonnes/year) will be used in cement production.

Figure 2.2a
Coal Ash Production, 1989-1994
ash produced in 1000's of tonnes

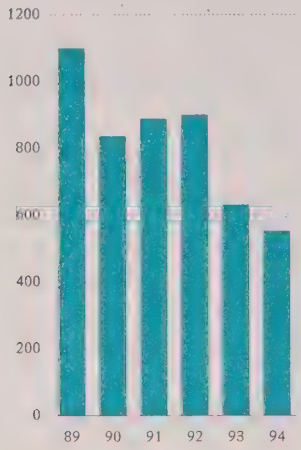


Figure 2.2b
Coal Ash Production Per TWh, 1989-1994
kilotonnes/TWh (net)

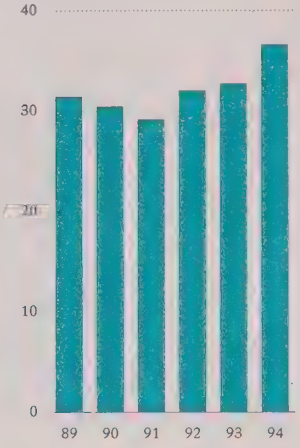
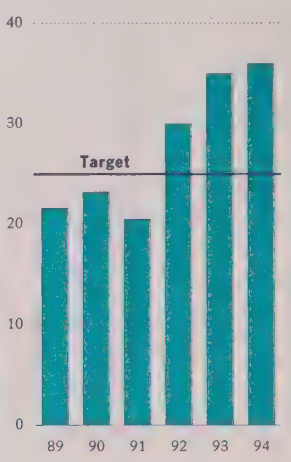


Figure 2.2c
Coal Ash Utilization, 1989-1994
per cent ash utilized



2.3 Community/Municipal Utility Partnerships

Objective

To forge partnerships with suppliers, municipal utilities and interested associations in order to promote energy and resource use efficiency.

1994 Results/Initiatives

- Ontario Hydro, in partnership with the Ministry of Environment and Energy, municipal utilities, community groups and others, planned and delivered a broad range of resource conservation initiatives to homes and businesses in each of the 16 Green Communities in the province. Hydro helped communities plan and deliver initiatives to promote energy and water-use efficiency, reduce waste and increase environmental awareness.
- Ontario Hydro participated in the Sustainable Communities Working Group (a multi-stakeholder group and part of the Ontario Round Table on Environment and the Economy) to prepare a Sustainable Communities Resource Package. The package is intended to support community-based initiatives in fostering and promoting community sustainability.
- Ontario Hydro signed joint purchasing agreements with over 30 municipal electric utilities for items such as utility poles, wire and cable, transformers and line hardware. Joint purchasing lowers costs, reduces inventories, increases procurement power and furthers sustainable energy development by encouraging suppliers to develop eco-efficient products.

Five Pillars of SED

3.0 Increasing Use of Renewable Energy

Wind, sunlight and falling water are abundant and flexible energy sources with little environmental impact from their use. By fostering the development of renewable energy technologies, Ontario Hydro will not only reduce its own need for future fossil and nuclear generation capacity, but also contribute measurably to worldwide efforts towards sustainable development.

3.1 Renewable Energy Technologies (RETs) Strategy

Objective

To promote and assist in the development and marketplace acceptance of advanced renewable energy technologies, working with a range of partners and stakeholders.

1994 Results/Initiatives

- The Renewable Energy Technologies (RETs) Strategy and Program, developed through discussions with internal and external stakeholders, were approved by Ontario Hydro's Board of Directors in September, meeting the 1994 Corporate Performance Measure target.

- The RETs Strategy and Program have two stages: Stage I will run from 1995 to 2000 and is budgeted at $110 million in new funding. The nine elements of the RETs program will lay the groundwork for the long-term success of RETs through technology development, demonstration and gaining operating experience and commercialization in niche markets. Stage II, after 2000, aims to have RETs competing on an equal footing with other energy options. Examples of RETs technologies included in the program are photovoltaics, solar thermal, wind, micro-hydro, biomass, methane recovery from landfill and technologies for storing and converting renewable energy resources. At year end, work was underway in defining and implementing the various program elements, including a competitive request for proposal process for up to 125 MW of grid-connected RETs, expected to be initiated in 1995.

3.2 Renewable Energy Technologies

Objective

To increase knowledge and expertise in the installation, operation and performance of a broad range of renewable energy technologies.

1994 Results/Initiatives

Remote Community Pilot Projects

- Pilot renewable energy systems have been in service at remote communities served by the Retail System Business Unit since the mid to late 1980s. These include a mini-Hydel system at Sultan (150 kW); a

wind turbine at Fort Severn (60 kW); and a photovoltaic system at Big Trout Lake (10 kW). During 1994 these systems generated a total of 144 MWh, representing 0.35 per cent of the power supplied to remote community customers.

Fuel Cells

- A 200 kW phosphoric acid fuel cell (PAFC) power plant unit was installed at Ontario Hydro's Markham Centre office building in the spring. The unit will be monitored until the end of 1996 to determine if it can successfully operate as a commercial installation using Canadian natural gas in a load displacement cogeneration application.

- A pressurized Solid Oxide Fuel Cell (SOFC) Test Facility, a joint project of Ontario Hydro, Westinghouse and other partners, began operating at Ontario Hydro Technologies in 1994. The fuel cells performed well when tested with either hydrogen or natural gas under high pressure. Based on test results, Westinghouse is planning a major program to further develop their pressurized technology. Tests at the facility are scheduled to continue until the end of 1995.

Solar

- Three photovoltaic systems on the roof of the Hugh MacMillan Rehabilitation Centre in Toronto became fully operational in 1994. The systems, totalling 75 kW, are capable of supplying up to one-sixth of the centre's peak electrical demand during the summer air-conditioning periods. Their performance will be closely monitored over the next several years.

- A photovoltaic test facility has been installed on the roof at Ontario Hydro Technologies and will be used to evaluate photovoltaic modules and other related components.

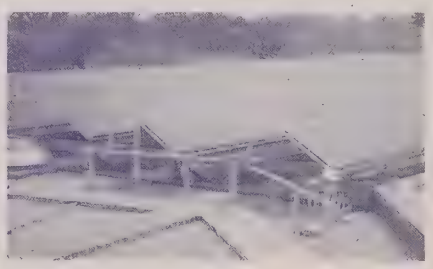
- The electric fence used for deer management at Bruce Nuclear Power Development is powered by photovoltaic cells.

Wind

- A one-year test program of the Canadian Agra 80 kW wind energy project was completed. This project, co-sponsored by Canadian Agra Corporation, Ontario Hydro, Ministry of Environment and Energy and Natural Resources Canada, demonstrated that the wind resource at the Lake Huron shoreline compares well with other areas in the world where wind is utilised for energy production. The wind turbine tower failed after 15 months of operation due to a structural flaw in the base. The owners intend to install another machine at the site in 1995.

- The now-proven wind resource at Lake Huron led to a 600 kW cold-climate wind turbine development project by Tacke Windpower Incorporated, a company based in London, Ontario. This project will receive Ontario Hydro financing and the machine may be erected on land adjacent to the Bruce Nuclear Power Development.





Three photovoltaic systems installed on the roof of the Hugh MacMillan Rehabilitation Centre in Toronto became fully operational in 1994. The three systems represent different technologies and are part of a long-term evaluation program.

Five Pillars of SED

4.0 Integrating Environment into Business Decisions

Environmental considerations are

an integral part of Ontario Hydro's decision-making framework. In looking to reduce the environmental impact of its operations, Hydro is committed to the development and application of full cost accounting techniques and integrated resource planning. These considerations and activities are aimed at increasing energy and resource sustainability, while protecting the environment.

4.1 Environmental Spending

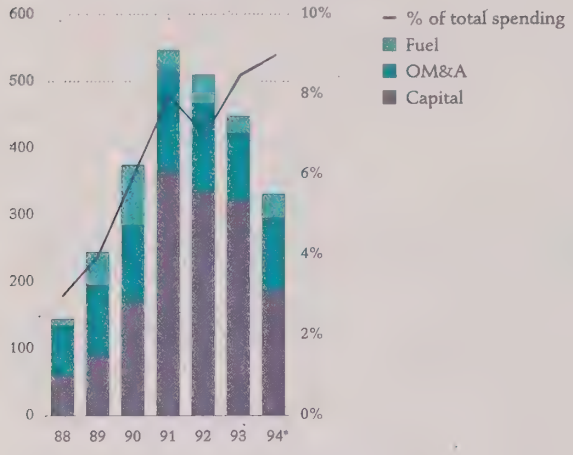
Objective

To better understand and manage environmental spending in order to enhance performance and identify cost-effective means of meeting environmental objectives.

1994 Results/Initiatives

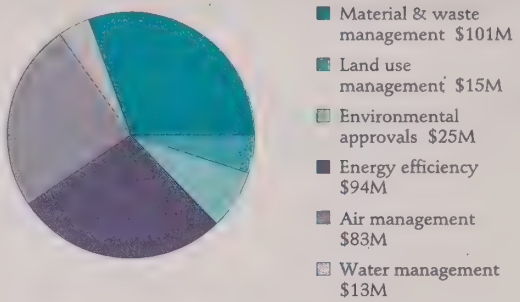
- Environmental expenditures were estimated to be $331 million (see Figure 4.1a). Costs ($68 million in capital and $26 million in OM&A) associated with improving internal and customer energy efficiency were included as environmental expenditures for the first time in 1994.
- Material and waste management, energy efficiency and air management were the most significant elements of 1994 environmental expenditures (see Figure 4.1b). Material and waste management included nuclear used fuel ($26 million) and ash management ($19.5 million); air management included $68.4 million for acid gas management (scrubbers); and energy efficiency included $2.3 million for internal energy-efficiency programs.
- 1994 environmental expenditures were 47 per cent lower than those in 1993, excluding energy-efficiency spending. This is largely due to a 29 per cent reduction in overall corporate spending (excluding interest and depreciation costs) and completion of the Lambton Generating Station scrubbers project. Approximately $121 million was spent on scrubbers in 1993.

Figure 4.1a
Environmental Expenditures, 1988-1994
millions of dollars *per cent of total spending*



* Includes $68M in Capital & $26M in OM&A for Energy Efficiency Improvement projects

Figure 4.1b
Environmental Expenditures, 1994
total: $331 million



4.2 External Impacts and Costs

Objective

To use the principles of full cost accounting (FCA) as a means to better integrate environmental considerations into business decisions by focusing on the least cost to society of energy production and use.

1994 Results/Initiatives

- A draft FCA Strategy was under development in 1994 that describes Ontario Hydro's approach and direction for developing and implementing FCA.

- A fossil system environmental dispatch simulation that incorporated existing fossil externality values was completed.

- Ontario Hydro participated in several FCA studies and working groups in cooperation with such organizations as: the Canadian Institute of Chartered Accountants (CICA), the Business Council on Sustainable Development (BCSD) and the United States Environmental Protection Agency (USEPA).

- A preliminary Multi-Criteria Analysis-Based Evaluation Framework was developed and used within the Windsor-Chatham LIRP Process to evaluate environmental and other plan attributes such as cost and reliability.

- An externalities seminar was delivered to staff from the various business units to increase awareness and understanding of externalities and issues associated with quantification and monetization.

- A Grid System Business Unit Externalities Co-ordinating Team was established to identify, quantify and, where possible, monetize Grid externalities. The team identified the most significant potential Grid-related externalities, including the human health effects of electric and magnetic fields, the effects on ecosystems of transmission corridors, waste disposal issues and the impact of transmission facilities on property values, recreation and tourism. The team also began a review of existing information concerning the impacts of externalities on people, society and ecosystems. Ontario Hydro Nuclear also established a team with a similar mandate.

4.3 Business Case Summaries

Objective

To assist Ontario Hydro business units in defining the Sustainable Energy Development (SED) implications of those investment decisions that require senior management or Board of Directors approval.

1994 Results/Initiatives

- SED Decision Criteria were developed in 1994 and approved by senior management. These criteria, to be used until Full Cost Accounting is fully implemented, were applied to all investment decisions made by senior management beginning

in October. The SED implications of eight Business Case Summaries (BCS) were reviewed. All but one addressed the criteria appropriately and were recommended for senior management approval. The incomplete BCS was withdrawn.

4.4 Integrated Resource Planning

Objective

To ensure that all available options are considered in determining how best to meet customer energy needs.

1994 Results/Initiatives

4.4.1 Local Integrated Resource Planning (LIRP)

- Nine Local Integrated Resource Planning studies were carried out in the Collingwood, Downsview, Guelph, Peterborough/Port Hope, Greater Toronto, Windsor/Chatham, Niagara-on-the-Lake, Ottawa and Northeastern Ontario regions.

- The Collingwood LIRP study showed that a program to reduce demand by 9 MW through energy management initiatives would defer the need for construction of any major new capacity to beyond the year 2000. An industrial load shifting feasibility study was completed in 1994.

Win-Win Sustainable Development Initiatives

Sale of Gypsum from Lambton GS to Westroc

The Flue Gas Desulphurization (FGD) process (also known as "scrubbers") installed at Lambton Generating Station significantly reduces acid gas emissions from the burning of high-sulphur coal. Gypsum, a by-product of the FGD process, was previously sent to landfill. Beginning in 1995, gypsum will be shipped to Westroc Industries of Mississauga for the manufacture of drywall. Hydro will generate revenues from gypsum sales and avoid significant disposal costs.

Replacement of Dry-Cleaning Solvents

Changing from CFCs to perchloroethylene in Ontario Hydro Nuclear's dry-cleaning operation, as well as new sorting procedures, have resulted in reduced financial and environmental costs.

Wood Chips Recycling by Utilities

Wood chips generated from line clearing and tree-trimming activities of Retail Utilities were previously sent to landfill. Of the 17,310 tonnes of wood chips generated in 1994, over 98 per cent were sold or given to customers and nurseries.

Lake Ontario Waterfront Trail

As part of the Crombie Commission recommendation to create a waterfront trail from Burlington Bay to the Trent River, Ontario Hydro developed an environmental partnership with the Township of Clarington. Hydro permitted the use of a portion of its transmission line right-of-way for construction of the trail. Environmental impact from construction of the trail was minimized by using existing Hydro roadways. By leaving sections of road in place (that normally would be removed) for the trail, more than $30,000 savings in road-removal costs were realized.

Reduction in energy consumption at Chats Fall GS

New technology was implemented to reduce energy consumption by 75 per cent at Chats Fall Hydroelectric Generating Station. The surplus heat from the station service transformer was used to heat the staff maintenance building.

- The Downsview feasibility study identified almost 70 MW of demand-side management potential and 40 MW of NUG potential. The Guelph feasibility study recommended the supply alternative of a smaller transformer station by 1996. Results of the Toronto Integrated Electrical Service (TIES) demand-side management options will be presented to Hydro senior management in 1995; external review is underway.

4.4.2 CORPORATE INTEGRATED RESOURCE PLANNING

- The Corporate Integrated Resource Planning process was initiated in 1994 and is to be completed in 1995. The purpose is to provide strategic advice on resource allocation decisions for the 1996 business planning cycle. Activities in 1994 focused on defining objectives, establishing criteria and measures and developing a list of supply and energy service options.

4.5 Non-Utility Generation

Objective

To meet customer needs with non-utility generation (NUG) that fosters efficiency, competitiveness and sustainable development.

1994 Results/Initiatives

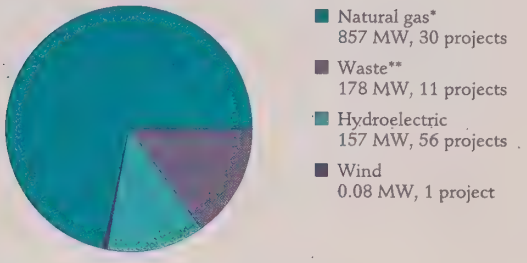
- Negotiations with 44 of the 66 NUG projects put on hold in December, 1992 continued during 1994. In April, Ontario Hydro decided to offer new and final purchase rates to 28 of the small NUG projects and work continued to resolve the 16 large projects. By year end, contracts for 12 of the 16 large projects were in place.

- Fourteen NUG projects, totalling 229 MW, were placed in service in 1994, including seven load-displacement NUGs totalling 58 MW. Six were hydroelectric and eight were natural gas-fuelled cogeneration.

- Ontario Hydro purchased 4,994 GWh of energy from thermal NUGs in 1994, at a cost of $281 million. Estimated emissions from these NUGs were 1.7 Gg NO_x, 0.1 Gg SO_2, and 1,868 Gg CO_2.

Figure 4.5 shows the total NUG capacity at year end. Capacity includes Purchase and new Load Displacement NUGs.

Figure 4.5
In-Service NUGs by Fuel Type, 1994



* Includes natural gas component of dual fuelled (waste/natural gas) facilities
** Wood waste, landfill gas and municipal solid waste

4.6 Buy Green

Objective

To minimize adverse environmental impacts of materials purchased by Ontario Hydro.

1994 Results/Initiatives

- A working group was established to assist in implementation of Buy Green work plans across the corporation that include key linkages and involvement in related initiatives such as the Ozone Depleting Substances Strategy, In-house Energy Efficiency, Waste Reduction, Green Office and the Hazardous Materials Control programs.

- Selection criteria for purchasing green products was developed for general-purpose chemical cleaning products. These criteria are intended to be introduced initially as a trial process to evaluate products based on their environmental attributes.

- Corporate *Enabling Policies & Principles* for purchasing and materials management in Ontario Hydro were approved and issued. The document supports the Buy Green program and focuses on total life-cycle cost.

- A process that included criteria on environmental sustainability was developed for selecting and rating suppliers. This method for determining "preferred" suppliers is expected to be implemented in 1995, initially for Corporate Commodity contracts.

- The Retail System Business Unit purchases over 10,000 new pole-top and pad-mounted transformers each year. A joint study with Business Services determined that over $2 million annually could be saved if a total life-cycle approach were implemented. Savings will result from bulk purchasing and returning used transformers to the supplier for refurbishment or recycling.

Five Pillars of SED

5.0 SOCIAL INTEGRITY

Ontario Hydro must fulfil its mission in ways that respect and learn from the needs, concerns and aspirations of the communities it affects. In doing so, Hydro will strive to be a model of human resource management that values and rewards employee involvement, creativity, competency, initiative and teamwork.

5.1 Community Impact Management

Objective

To minimize adverse effects and help manage community change associated with Ontario Hydro projects, and improve relationships between Hydro and the affected communities.

1994 Results/Initiatives

- A Grid System Business Unit initiative involving municipal politicians and neighbouring property owners identified a 3-hectare site in a North York right-of-way where conventional methods of vegetation maintenance could be replaced by more sustainable methods. Rather than cutting grass and applying herbicides, native trees and shrubs have been planted, and the area will be allowed to evolve into a wildflower meadow. The benefits to Ontario Hydro include reduced maintenance costs and improved habitat for flora and fauna, both on and adjacent to the right-of-way.

- Committees of employees and community representatives were established at Lambton GS and Lennox GS to manage the impact of mothballing generating units at these stations.

- Opportunities for applying SED principles to the Ear Falls generating station redevelopment project were identified. Specific targets and action plans were developed in the areas of energy efficiency, renewable energy technologies, Aboriginal and local employment and purchasing, waste management strategies and mitigation techniques.

- Ontario Hydro Nuclear has undertaken numerous initiatives to help manage change and improve community relationships. Examples include: sharing expertise at fire training facilities; open houses on nuclear-related issues; and regular public reporting on radioactive emission information through *Operations Monitor*, a publication of the Atomic Energy Control Board, which is distributed in communities around OHN facilities.

5.2 Stakeholder Involvement Programs

Objective

To build key relationships and provide processes and leadership for integrating public input with corporate decision making.

1994 Results/Initiatives

- Industrial and Utility Customer Advisory Panels were created to provide an ongoing forum for customers to provide input on key Hydro initiatives early in the decision-making process.

- Ontario's Energy Efficiency Consortium, of which Ontario Hydro is a member, produced its report *Accelerating Energy Efficiency in Ontario* in October. The initiatives launched by the Consortium will continue through the creation of a federally incorporated not-for-profit corporation — the Energy Efficiency Alliance.

- New initiatives were launched to involve stakeholders in Local Integrated Resource Planning (LIRP) efforts. Through newsletters and public information centres, stakeholders were provided with opportunities to review evaluation criteria, options and plans related to studies such as the Windsor/Chatham LIRP Study and the Toronto Integrated Electrical Service Study (TIES).

5.3 Aboriginal Initiatives

Objective

To create a partnership with Aboriginal communities that is healing, enduring and mutually beneficial.

1994 Results/Initiatives

- During 1994, Ontario Hydro continued to conduct consensus-seeking joint processes with First Nations to resolve their grievances regarding previous Hydro developments. Fourteen past grievance processes were underway during the year.

- Ontario Hydro approached major Aboriginal organizations, including Nishnawbe-Aski Nation, Grand Council Treaty #3, Union of Ontario Indians, Association of Iroquois and Allied Indians and Ontario Native Women's Association, to establish a regular program of consultation. Two organizations have agreed to participate and discussions are continuing with the others.

- The principles and methodology approved in 1993 for calculating the corporation's payments-in-lieu-of-taxes to First Nations for generation and transmission facilities on Reserve land resulted in the negotiation of five First Nations agreements with Ontario Hydro.

- The position of Aboriginal Business Facilitator was created to facilitate commerce between Ontario Hydro and Aboriginal companies.



- Aboriginal relations training of Hydro staff occurred at many work locations across the province. This training is intended to provide Hydro staff with the knowledge and skills necessary to better serve Aboriginal customers, and to better appreciate the environmental perspectives of First Nations.

- The Hydroelectric Business Unit participated in negotiations with First Nations and the Ontario government to develop terms and conditions related to the Mattagami Project Environmental Assessment, which formed the basis for subsequent government approval in December. One of the terms and conditions dealt with a commitment to jointly develop, with First Nations, an employment and contracting strategy.

5.4 Heritage Resources

Objective

To manage heritage resources in ways that identify and conserve all existing and potential heritage resources owned by Ontario Hydro.

1994 Results/Initiatives

- Bridgman TS, an historic transmission station in Toronto that has been out of service since 1982, began undergoing a major maintenance retrofit prior to its being used for another purpose within Hydro. The station was built in 1904 as a terminus for Niagara Power and was designed by Casa Loma's architect, E. J. Lennox.

- Ontario Hydro participated in a ceremony to recognize the corporation's contribution to the Carmen House Museum in the Village of Iroquois on the St. Lawrence River. Hydro waived its claim to the heritage building property.

- The final draft of the last two phases of the Conservation of Heritage Resources report was completed by the second quarter. By year end comments were reviewed from most business units, with final input scheduled for early 1995.

5.5 Corporate Citizenship Program

Objective

To provide a strategic approach to Ontario Hydro's financial support of non-profit organizations that demonstrate innovation in the fields of energy education, sustainable development and employment equity.

1994 Results/Initiatives

- The Corporate Citizenship Program was initiated in late 1994. The budget is based on one per cent of net income on a five-year rolling average. (A separate annual report is available by calling (416) 592-2991.)

- The program granted a total of $85,000 in support of the following sustainable development-related projects:

  - Learning for a Sustainable Future: a national program that is developing curriculum material on sustainable development for schools in cooperation with multi-stakeholder groups, including provincial ministries of education.

  - In-Kind Canada: an organization that matches donated goods and services from corporations with non-profit charities.

  - Earth Day Canada – Eco-Kids Clubs: the program provided funding to add 200 new clubs in Ontario. The mostly school-based clubs are aimed at 8-12 year-olds and provide hands-on activities for environment/sustainable development projects.

  - Lake Huron Trout Hatchery: the program provided funds to expand a volunteer-run trout hatchery.

5.6 SED Communication and Education

Objective

To foster widespread awareness and understanding of Sustainable Energy Development; to build support for SED; and to encourage the integration of SED



Thousands of Hydro employees in the Toronto area were encouraged to bike, walk, carpool or take public transit to work on Clean Air Day, winning a challenge from B.C. Hydro.

principles in Hydro's activities, practices and decision making.

1994 Results/Initiatives

- Three case studies documenting SED success stories were completed in 1994: herbicide reduction by the Retail System Business Unit; the fine paper recycling program; and coal ash sales from Nanticoke Generating Station.

- The Retail System Business Unit established an SED newsletter and the Grid System and Hydroelectric Business Units featured SED articles in their regular newsletters. Throughout the year, articles in *Hydroscope* frequently featured SED activities and initiatives.

- SED seminars and workshops were organized by five business groups within Hydro. Presentations were also made to external utilities, non-government organizations, community groups, student groups and government audiences.

- Ontario Hydro co-ordinated activities for Earth Day, Environment Week and a used clothing drive for Waste Reduction Week. Several business units actively participated in these events.

- Ontario Hydro won a challenge from B.C. Hydro on the Clean Air Commute with an outstanding 75 per cent participation rate. Employees were encouraged to bike, walk, carpool or take public transit to work on Clean Air Day, June 22, 1994, to promote the reduction of air pollution. Under the terms of the challenge, B.C. Hydro planted 10,000 trees in its local airshed. In turn, Ontario Hydro distributed tree seedlings to its participants and received an award from Pollution Probe.

- The *1993 Environmental Performance Report* received the gold award from the *Financial Post* for environmental reporting in the utilities category. SED was featured in Ontario Hydro's corporate annual report.

5.7 Employee Recognition and Awards

Objective

To provide formal recognition to Ontario Hydro employees for their innovations and ideas, including those related to sustainable development, that contribute to the well-being of the corporation.

1994 Results/Initiatives

- Ontario Hydro's employee suggestion program – TIPS (The Ideas People Suggest) – has not been actively promoted over the past two years due to corporate restructuring. As a result, the volume of submitted ideas is lower than previous years. There were, however, 14 environmental and energy-efficient TIPS supported in 1994, of a total of 250 suggestions submitted.

- The President's Sustainable Energy Development Champion Awards program was developed for implementation in 1995, to recognize employees or teams of employees who have demonstrated significant levels of innovation, dedication and effort in the field of sustainable energy development.

6.0 International Environmental Activities

Ontario Hydro International Inc.

takes Ontario Hydro's experience and reputation to a worldwide level, with the goal of demonstrating international leadership in sustainable energy development.

6.1 Ontario Hydro International Incorporated

Objective

To ensure that Ontario Hydro International Incorporated (OHII) is a leader in energy efficiency and sustainable energy development in the international marketplace.

1994 Results/Initiatives

- OHII issued its *Sustainable Energy Development Approach,* which set out the corporation's SED-related principles, operating framework, performance measures, project screening criteria and performance reporting and auditing processes. OHII has committed to promoting sustainable energy development principles in all the activities it markets around the world.

- A major consultancy project by OHII in the People's Republic of China, in partnership with Hydro's Grid System and Fossil Business Units, provided an example of the transfer of SED knowledge and experience from Ontario to a country facing massive growth in energy demand. The Hydro team conducted an electrical power development study for the Tianjin Economic and Technological Development Area in northeast China. Using an integrated resource planning approach, the team recommended a development strategy that provides a mix of demand- and supply-side options, including energy-efficiency and demand management programs.

- In Czech Republic, OHII participated in a joint venture co-generation project with Novion and Solo Suisce to generate 15 MW of power.

- In Venezuela, OHII conducted energy audits and energy-efficiency training for the local utility. In Brazil, a five-phase demand-side management (DSM) contract was awarded to OHII for the provision of consulting services in the area of Integrated Resource Planning.

- In Thailand, OHII started the implementation of a contract with the Electricity Generating Authority of Thailand (EGAT) to provide DSM consulting services and to establish an Integrated Resource Planning Process.

- In India, the first phase of a DSM project in the State of Maharashtra was completed.

6.2 Other International Activities

Objective

To engage in international partnerships that allow Ontario Hydro to both share its SED vision with the world and benefit from the experience of others.

1994 Results/Initiatives

- As a member of the World Business Council on Sustainable Development, Ontario Hydro was active in developing an international position on global warming and joint implementation measures. The Council was formed to provide a business perspective on environment and development to the 1992 Rio Conference and to be an industry voice in its follow-up.

- Ontario Hydro is also a member of the E7, a network of the world's largest electrical utilities. Its goal is to help protect the global environment, principally by promoting the efficient generation and use of electricity. In 1994, Hydro participated in E7 training seminars on environmental impact assessment in Mexico, India and Jordan. Hydro also represented E7 at a United Nations Development Program workshop for developing countries on Joint Implementation in Brazil.

- Ontario Hydro's Chairman attended many international events to communicate how Hydro is working to become a leader in sustainable development.

- The Global Energy Efficiency Collaborative was initiated by Ontario Hydro and the Earth Council to help accelerate global energy-efficiency efforts.

Appendix A

STATUS OF SED RECOMMENDATIONS – YEAR END 1994

(Refer to *A Strategy for Sustainable Energy Development and Use for Ontario Hydro*, October, 1993)

	UNDER REVIEW & DEVELOPMENT	DECLINED/ DEFERRED	APPROVED	IMPLEMENTED	COMMENTS
Chapter 1: Hydro's Mission and Sustainable Development					
1.1 To adopt the 6 guiding principles	X				Now scheduled for the Board in April '95 (originally targeted for Q3 '94).
1.2 Educate on Sustainable Energy Development	X				Little concerted effort to date. A number of event-type projects, e.g., Earth Day, Environment Week, Clean Air Day.
1.3 Adopt the 10-point strategy for Sustainable Energy Development	X				Now scheduled for the Board in April '95 (originally targeted for Q3 '94).
1.4 Adopt a set of SED performance measures to assess Hydro's annual progress			X		SDI framework approved by Environment/Health & Safety Committee on September 12, 1994 and Board on October 17, 1994. 1995 will be pilot year for SDI application.
1.5 Establish data sources for a set of SED performance measures			X		Data sources are identified in the Sustainable Development Indicators framework approved by the Board on October 17, 1994.
1.6 Use developed SED performance indicators to report on progress	X				1995 will be pilot year for SDI application. A public report for 1995 is expected in 1996.
Chapter 2: Introduce a Positive Institutional Culture					
2.1 Initiation of awareness building program	X				No formal awareness building program yet. Efforts have been ad hoc to date. SED Communication and Education plan under development.
2.2 Leadership in SED awareness building	X				Little effort yet.

	Under Review & Development	Declined/ Deferred	Approved	Implemented	Comments
2.3 Develop and implement SED training programs	X				Training programs are largely the responsibility of the Business Units. Little activity to date.
2.4 Develop and implement reskilling programs for employees	X				No activity to date.
2.5 Having employee representation on the Board			X		This will be completed with the formal appointment of a Society representative to the Board.
2.6 Employee representatives on business unit management committees				X	Most, if not all, Business Unit Management Committees have PWU and Society representatives.
2.7 Adopt Continuous Quality Improvement principles				X	Most, if not all, Business Units have adopted CQI principles or their equivalent.
2.8 - 2.11 Recognition and awards programs	X				Existing recognition and awards programs (e.g., TIPS) have not been revised to incorporate SED.
2.12 Incorporate SED into job descriptions/recruitment	X				Little activity to date, although SED has been noted in some recent ESR job descriptions.
2.13 Incorporate SED into performance ratings				X	The Corporate Performance Measures and related performance pay for ESR level have been approved. CPMs contain some SED criteria and will be linked with SDIs in the future.
2.14 Establish a Green Fund to stimulate innovation and SED investments	X				No progress in 1994, although alternatives to a fund were investigated.
2.15 Float Green Bonds to finance the Green Fund	X				No progress in 1994.
2.16 The Green Fund to encourage SED technologies through a seed fund	X				No progress in 1994.
Chapter 3: Integrate Environment and Economics in Decision-Making					
3.1 The Board to deal with the strategic, policy and priority issues of the SED strategy	X				Now scheduled for Board in April '95 (originally targeted for Q3 '94).

	UNDER REVIEW & DEVELOPMENT	DECLINED/ DEFERRED	APPROVED	IMPLEMENTED	COMMENTS
3.2 Incorporate SED into decision-making documents				X	A set of sustainable energy development decision criteria have been approved and are required for all Business Case Summaries as of October 1, 1994.
3.3 CEO identified as Chief Sustainable Development Officer (SDO)				X	
3.4 Establish a Sustainable Energy Strategies Group		X			The Chairman has decided that the work program recommended for the SESG will be undertaken by the Environment & Sustainable Development Division.
3.5 Heads of business units as Senior SDOs			X		Most Business Unit Leaders are acting as senior SDOs; in other cases such leadership is not clear.
3.6 BUs responsible for SED consistent with corporate goals principles and policies			X		Most Business Unit Leaders have established responsibilities and accountabilites for SED. However, resources are weak in some areas.
3.7 Integrated Resource Planning			X		Local Integrated Resource Plans are underway in a number of locations. Corporate Integrated Resource Planning has been approved and initiated.
3.8 With regard to First Nations – Hydro to develop a policy of joint stewardship – establish regular consultation – address past grievances – promote employment equity – continue to involve First Nations in project planning	X				• Consultation with First Nations on joint stewardship will follow government-to-government agreements between individual First Nations and Ontario. • Major Aboriginal organizations were approached to establish regular consultation; two organizations agreed to proceed. • Hydro is committed to resolving past grievances and is proceeding with fourteen past grievance processes. • The corporate Employment Equity program is in place. Aboriginal Business Facilitator is in place to facilitate commerce between Hydro and Aboriginal companies.

continued on next page

	Under Review & Development	Declined/ Deferred	Approved	Implemented	Comments
					• First Nations are participating in project planning (e.g., Ear Falls hydroelectric redevelopment, Otter Rapids road reconstruction, and Patten Post hydroelectric project).
3.9 Establish a multi-stakeholder Advisory Round Table on SED	X				This Round Table has not yet been established. An SED Advisory Panel is proposed instead – to be initiated in 1995.
3.10 Disband the Environmental Advisory Panel		X			It is proposed to expand the EAP to form an SED Advisory Panel.
3.11 Establish a mechanism for regular public demand/supply plan reviews	X				Little work to date.
3.12 MEA/MOEE/OH consultation to implement SED recommendations	X				There are no formal mechanisms for consultation on SED with MEA or MOEE. Contact is on an ad hoc, issue-specific basis at present. Expect MEA to become member of Hydro Board in 1995.
3.13 Hydro, MOEE and the Ontario Environmental Assessment Board to jointly develop a mechanism for the pre-hearing scoping of issues with potential intervenors	X				
Chapter 4: Introduce Full Cost Accounting					
4.1 Full Cost Accounting – Modify accounting system	X				Development work underway.
4.2 Incorporate environment, social and private costs into a framework for financial evaluation	X				SED Decision Criteria were approved and issued; evaluation required from FCA perspective. A draft FCA Strategy was under development. Preliminary multi-criteria analysis-based evaluation framework was developed and used in LIRP.
4.3 Support research on FCA	X				A number of Business Unit/ Environment & Sustainable Development Division FCA working teams were established to examine externalities. Monitored ongoing externality research in North America and Europe.

	UNDER REVIEW & DEVELOPMENT	DECLINED/ DEFERRED	APPROVED	IMPLEMENTED	COMMENTS
4.4 Training for FCA	X				Externalities seminar held in March. FCA presentations made to Ontario Hydro staff. Training provided on SED Decision Criteria. FCA Backgrounder prepared.
4.5 Take FCA beyond Ontario Hydro				X	Ontario Hydro participated in the OEB consultative process on externalities until April 1994. Participated in CICA working group to examine FCA.
4.6 Establish a fund for future costs of decommissioning generating facilities			X		Approved by Board in June '94, on schedule. Investment policy for Fund is scheduled to return to Board before January '95 but this is unlikely to happen since changes to the *Power Corporation Act* have not been initiated by the Province of Ontario.
4.7 The decommissioning fund should be separate from operations of Hydro and should be managed and accounted for independently under the oversight of the Board of Directors			X		See Recommendation 4.6.
Chapter 5: Strengthen Energy Efficiency and Demand Management Programs					
5.1 Charge for internal energy use		X			Internal EE Program recommended against a charge for electricity use at this time. Accepted by Senior Management.
5.2 Establish internal energy efficiency programs and targets				X	292 GWh saved in 1994 as compared to target of 175 GWh.
5.3 Integrate energy efficiency into planning/investment/budget			X		
5.4 Establish and report on targets for business unit's energy efficiency				X	1994 corporate target of 175 GWh of electricity savings was set.
5.5 Provide funding for internal energy efficiency programs				X	
5.6 Establish an In-house Energy Efficiency Group				X	Established in Spring '94.

	Under Review & Development	Declined/ Deferred	Approved	Implemented	Comments
5.7 Provision of free basic services to business units for energy management				X	Free audit and assistance now available to BUs.
5.8 Develop energy efficiency awareness programs			X		
5.9 Develop an energy efficiency database/benchmarks	X				Little progress to date. Responsibility has been transferred back to Environment & Sustainable Development Division.
5.10 Develop and present recommendations on the resourcing framework and levels for the corporation's demand management plan	X				
5.11 Examine trade-offs between energy efficiency and rates	X				
5.12 Establish a Demand Management Advisory Group				X	The Ontario Energy Efficiency Consortium has completed its initial work and submitted a report.
5.13 Work with stakeholders to develop a provincial energy strategy	X				
Chapter 6: Hydro's Environmental Performance: From Compliance to Leadership					
6.1 Initiate changes to regulations to enhance cost effectiveness	X				
6.2 Each business unit to have an environment management system consistent with the corporate system			X		Environment & Sustainable Development Division has produced and received approval for a corporate EMS Framework. BUs are developing consistent EMS's.
6.3 Reduce residual emissions	X				
6.4 Develop emissions trading initiatives with MOEE	X				Exploratory work is underway with a range of industries and stakeholders on emission reduction trading opportunities with respect to SO_2 and NO_x.

	UNDER REVIEW & DEVELOPMENT	DECLINED/ DEFERRED	APPROVED	IMPLEMENTED	COMMENTS
6.5 Develop a greenhouse gas emissions strategy that will: – stabilize emissions to 1990 levels – examine the feasibility of moving to a target of 20% below 1990 levels by the year 2005 – commit Hydro to go "beyond compliance" – explore the possibility of "off-sets"	X				Accepted by EHS Committee in December '94; submitted for Board consideration in January '95.
6.6 The Board adopt the 1992 Corporate Reference Plan for the elimination of Ozone Depleting Substances				X	Approved by Board in July '94. Implementation has commenced.
6.7 Adopt a corporate goal on biodiversity	X				A Strategy is under development. Scheduled for Board consideration in Q2 '95.
6.8 Develop a biodiversity code of conduct	X				A workgroup has been formed and a draft strategy prepared; currently under review by BUs.
6.9 Evaluate the current reforestation program	X				Part of biodiversity strategy.
6.10 Recommend guidelines for contaminated real estate			X		Phase I Guidelines for assessment of contaminated lands have been completed. Training is underway.
6.11 Develop a strategy for negotiating water levels/flows with MNR	X				Preliminary discussions underway with MNR, MOEE, and Treasury.
6.12 Develop a concept with a plan/schedule for nuclear used fuel and waste	X				A revised radioactive waste strategy is currently under active development. Fuel waste concept being reviewed for Federal EARP Panel.
6.13 Develop a PCB plan that will include establishing a destruction facility in Ontario, commercialising OHT's disposal technology and providing for withdrawal of PCBs from use	X				Revised PCB Strategy and implementation plan are under preparation.
6.14 Develop a corporate policy for virtual elimination of toxic substances	X				Pollution prevention task group is underway, led by Environment & Sustainable Development Division.
6.15 Accelerate hazardous material substitution	X				Pollution prevention task group is underway, led by Environment & Sustainable Development Division.

	Under Review & Development	Declined/ Deferred	Approved	Implemented	Comments
6.16 Targets to reduce resource use/waste streams	X				Waste audits being carried out by business units.
6.17 Matters relating to EMF			X		Health & Safety now has leadership on EMF. A number of studies and initiatives have been approved throughout Ontario Hydro.
Chapter 7: Deploy Hydro's Procurement Power Strategically					
7.1 Deploy procurement power strategically			X		Corporate procurement policy, approved in Q4 '94, supports the Buy Green Initiative.
7.2 Mandate a procurement policy based upon Buy Green/ISO 9002.			X		Corporate procurement policy, approved in Q4 '94, supports the Buy Green Initiative.
7.3 Establish a small procurement policy group		X			The VP Services has established a management committee, which as part of its responsibilities, meets this recommendation.
7.4 Establish procurement pre-qualification guidelines	X				Some work underway.
7.5. OHT to provide seed money for eco-efficient technologies in Ontario	X				
7.6 Pursue joint purchasing agreements	X				Potential agreement with MEUs being investigated.
7.7 Adopt a NUG purchase policy which promotes SED	X				Originally scheduled for Q4 '94. Linkage to RETs Strategy.
7.8 Pursue strategic alliances for procurement which support SED	X				Little work to date. Business Services is looking at supplier pre-qualification.
7.9 Pursue the 3-Rs and report on progress annually	X				A number of reuse and recycling initiatives predate the SED Report. However, new and more comprehensive initiatives have not yet been undertaken (e.g., Green Office). Existing programs also require improvement.
7.10 Encourage Pension Fund to implement an "SED Screen" for future investments		X			PIFIC decided in June '94 against an SED Screen.

	UNDER REVIEW & DEVELOPMENT	DECLINED/ DEFERRED	APPROVED	IMPLEMENTED	COMMENTS
Chapter 8: Develop, Adopt and Promote Sustainable Energy Technologies					
8.1 Allocate 75% of OHT's OM&A budget to SED technologies by 1996	X				Proposals (not yet approved) call for about 25% of corporate R&D budget to sustainable technologies in 1995.
8.2 OHN and OHT to renegotiate terms of CANDU Owners Group (COG)	X				There is a proposal under the '95 Business Plan to reduce funding to COG by $20 million (about 25%)
8.3 Provide a venture fund of $30M for SED technologies at OHT	X				Originally scheduled for Q4 '94.
8.4 Hydro implement the recommendations of the Council on Renewable Energy			X		RETs Strategy approved by Board on September 12, 1994. Budget being confirmed in Business Planning Process. Announcement made November 15, 1994.
8.5 25 MW of renewable energy be acquired in packages of 5 MW or less			X		Approved by Board on September 12, 1994. Budget now confirmed in Business Planning Process.
8.6 Explore waste heat utilization				X	Assessment of opportunities of district heating and industrial use of waste heat have been undertaken. Action on identified opportunities remains to be taken.
Chapter 9: Increase International Market Opportunities for Sustainable Energy					
9.1 OHII guided by SED principles			X		Approved by EHS Committee on September 28, 1994. Submitted as part of Business Plan to Ontario Energy Board.
9.2 Approve staffing policies for OHII activities relating to use of ex-Hydro employees.	X				
9.3 Recognize OHII service in performance contracts	X				
9.4 OHII sole contact for marketing corporate products and services internationally			X		President declared this as part of his business model paper in September 1994.
9.5 Establish an International Energy Management Centre	X				

	Under Review & Development	Declined/ Deferred	Approved	Implemented	Comments
9.6 OHII adopt a Team Canada approach with industry	X				Underway to some degree, e.g., Asia Pacific.
Chapter 10: Communicate Opportunities for Sustainable Energy Development					
10.1 Adopt the SED Report's principles for communications products and services	X				
10.2 Make business units responsible for their own communications		X			Centralized role of Corporate and Public Affairs was approved by Senior Management.
10.3 Establish joint communication programs with stakeholders	X				
10.4 Establish flagship SED publications	X				Sustainable Development Indicators Report planned for 1995 reporting year - to replace Corporate Environmental Performance Report.
TOTALS:	59	6	19	14	

Appendix B

Sustainable Development Indicators – Analytical Framework

During 1995, the Sustainable Development Indicators (SDIs) framework will be assessed using 1994 performance data. The SDI reporting framework will form the basis for assessing and reporting publicly on corporate and business unit SED performance, beginning with 1995 as the baseline. The following are the 31 micro-indicators of sustainable development.

1 – Environmental Integrity – Continuously Improving Environmental Performance

1.1 - emissions/wastes/effluents (absolute and per unit of production)
- net greenhouse gas emissions
- persistent toxics
- radionuclide releases
- ODS releases
- hazardous/liquid industrial wastes
- acid gas releases
- volatile organic compounds
- oils
- solid wastes generated/diverted

1.2 - compliance record
1.3 - initiatives beyond compliance (pollution prevention, green purchases, etc)
1.4 - reportable spills and net loading
1.5 - biodiversity measures (under development)

2 – Energy and Resource Use Efficiency – Continuous improvement in efficiency (per unit of production)

2.1 - electricity used/lost internally
2.2 - thermal conversion efficiency of fuel
2.3 - water use (total permitted withdrawals)
2.4 - steam use/losses/waste heat recovered
2.5 - major commodities used
- fuel
- bulk chemicals
- computer and photocopier paper
- lubricating and insulating oils
- cables, transformers, utility poles

2.6 - investments in internal efficiency
2.7 - demand/supply management customer savings

3 – Renewable Energy – Increasing Development and Use

3.1 - energy from renewable resources
3.2 - installed capacity for renewable energy generation
3.3 - commercialization of renewable energy technologies
3.4 - capital investments in renewable energy technology capacity and R&D

4 – Financial Integrity – Integrating Environment into Business Decisions

4.1 - return on assets
4.2 - debt ratio
4.3 - interest coverage/cash flow
4.4 - unit energy cost/production unit energy cost
4.5 - non-electric revenues
4.6 - environmental/other risks
4.7 - externalities resulting from operations (monetized and non-monetized)
4.8 - environmental program expenditures

5 – Social Integrity

5.1 - lost time accidents and severity
5.2 - skill levels/utilization/job satisfaction
5.3 - employee suggestions to improve operation sustainability
5.4 - employee productivity
5.5 - community benefits derived from operations
5.6 - environmentally related complaints associated with operations
5.7 - hours training per employee and percent dedicated to sustainable development awareness and understanding

Glossary

Askarel: electrical insulating fluid consisting largely of PCBs (40% to 70%) and trichlorobenzenes.

Becquerel: a measure of the rate at which a radioactive material disintegrates. One becquerel corresponds to one disintegration per second.

Chlorofluorocarbons (CFCs): chemical compounds used as aerosol propellants, solvents and refrigerants. CFCs are believed to contribute to the depletion of the ozone layer and to the build-up of greenhouse gas.

Curie (Ci): a measure of the rate at which a radioactive material disintegrates. One curie corresponds to 37 billion disintegrations per second.

Electric and Magnetic Fields (EMF): EMF are invisible lines of force surrounding any electrical wire or device. They are created whenever electricity flows through a wire, whether a powerline, an appliance cord or home wiring.

Emission Reduction Trading: a market-based mechanism for emissions control whereby government assigns an emissions cap or limit for an area and also assigns a portion of this limit to each contributing industry as an emission allowance. Industry can then install control equipment or purchase or sell additional emission allowances from other industries.

Environment: the natural system of land, air, water, plants and animals including humans and their social, economic and cultural interactions with the system.

Environmental Spending: monies spent, on both natural and social environmental initiatives, whether capitalized or charged to operations, for equipment, labour, fuel and programs, to manage or reduce Ontario Hydro's impacts on the environment.

Flue Gas Desulphurization (FGD): the process in which sulphur dioxide is removed from the flue gas of a fossil-fuelled generation station; synonymous with "scrubbers".

Fly Ash: the fine, non-combustible particulate material derived from fossil fuel combustion that is transported out of the boiler in the flue gases and collected in an electrostatic precipitator for disposal or reuse.

Full Cost Accounting: a means by which environmental considerations can be integrated into business decisions. FCA incorporates environmental and other internal costs with data on the external impacts of Ontario Hydro's activities on the natural and social environment and on human health. In some cases these external impacts can be monetized and in other cases, only qualitative data are available. Ontario Hydro's consideration of natural environment will consider both resource use activities as well as issues of ecosystem health and integrity.

Industrial Ecology: occurs when one industry's by-product becomes another industry's feedstock, improving resource use efficiency and reducing environmental impacts.

Non-Utility Generation (NUG): electrical generation located in Ontario that Ontario Hydro does not own or operate. Non-Utility Generators are connected, directly or indirectly, to Ontario Hydro's power system. Small hydroelectric plants, cogeneration and energy from waste are examples of non-utility generation.

Opacity: the degree of transparency of a material. For example, low opacity would indicate a high transparency.

Ozone-Depleting Potential: the ratio of a calculated ozone column change for each mass unit of a gas emitted into the atmosphere relative to the calculated depletion for the reference gas CFC-11.

Pentachlorophenol (PCP): "penta" is used on transmission and distribution poles as a wood preservative to inhibit fungal and insect activity.

Polychlorinated Biphenyls (PCBs): synthetic chlorinated hydrocarbons with properties of low flammability and high chemical and thermal

stability. The manufacture, sale and use of PCBs in new equipment was banned in Canada in 1977. PCBs can still be found in the electrical industry as transformer and capacitor fluids.

PCB-contaminated oil: contaminated mineral oil used as electrical insulating fluid, containing more than 50 but less than 10,000 parts per million (ppm) PCBs by weight.

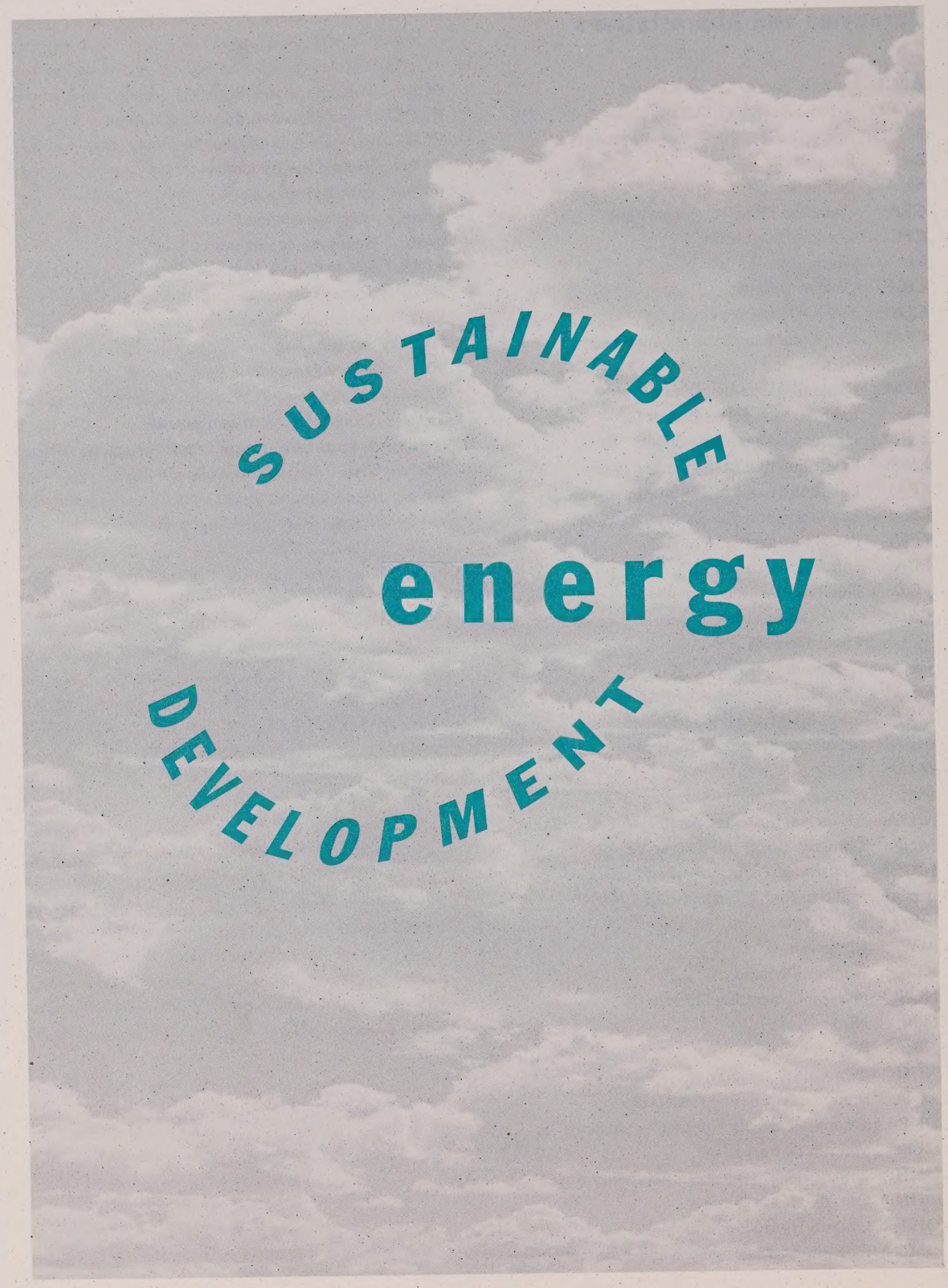
Radioactive Solid Waste: Type 1 Waste, representing the lowest level of radioactivity, is characterized by solid radioactive waste with a contact dose rate of less than 200 mrem/hr. Examples include common items such as mopheads, floor sweepings and protective clothing, which have become contaminated with low levels of radioactivity during routine clean-up and maintenance procedures. Type 2 Waste, representing an intermediate level of radioactivity, is characterized by solid radioactive waste with a contact dose rate greater than 200 mrem/hr but less than 15 rem/hr. Examples include ion exchange resins and filters used to clean water systems that circulate water through a nuclear reactor. Type 3 Waste, representing the highest level of radioactivity is characterized by contact dose rates greater than or equal to 15 rem/hr. Examples include the more radioactive ion exchange resins and filters, as well as reactor core components (such as pressure tubes) that have been removed from a reactor. It does not include irradiated fuel and fuel processing wastes.

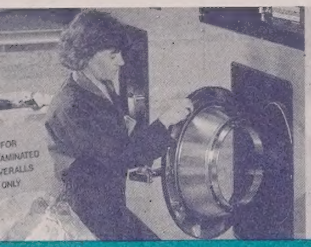
Sievert: the unit commonly used to measure the relative biological effect of radiation on the human body (1 sievert = 100 rem). 1 millisievert (mSv) = one thousandth of a sievert.

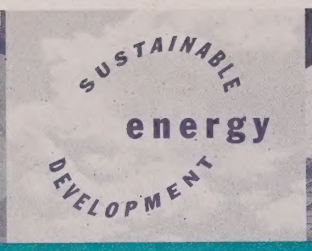
Sustainable Development: economic development that meets the needs of the present without compromising the ability of future generations to meet their own needs (*Our Common Future*, World Commission on Environment and Development, 1987).

Acronyms and Abbreviations

AECB: Atomic Energy Control Board
AECL: Atomic Energy of Canada Limited
BNPD: Bruce Nuclear Power Development
Bq: Becquerel
BU: Business Unit
CEA: Canadian Electrical Association
CFC: Chlorofluorocarbon
Ci: Curie
$C0_2$: Carbon Dioxide
COG: CANDU Owners Group
CPM: Corporate Performance Measure
DS: Distribution Station
DSM: Demand-Side Management
EA: Environmental Assessment
EMF: Electric and Magnetic Fields
EMS: Environmental Management System
EPA: Environmental Protection Act
ESA: Environmental Site Assessment
FBU: Fossil Business Unit
FCA: Full Cost Accounting
FGD: Flue Gas Desulphurization
GS: Generating Station (Hydroelectric or Fossil-Fuelled)
Gg: Gigagram (one billion grams)
kg: kilogram (one thousand grams)
LIRP: Local Integrated Resource Planning
MEA: Municipal Electric Association
MEU: Municipal Electric Utility
Mg: Megagram (one million grams)
MISA: Municipal Industrial Strategy for Abatement
MNR: Ministry of Natural Resources
MOEE: Ministry of Environment and Energy
mrem: millirem (one thousandth of a rem)
mSv: millisievert
MW: Megawatt
ND: Nuclear Division
NGS: Nuclear Generating Station
NO: Nitric Oxide
$N0_x$: Nitrogen Oxides
NUG: Non-Utility Generation (Independent Power Generation)
ODP-eq: Ozone-Depleting Potential equivalents
OEB: Ontario Energy Board
OHII: Ontario Hydro International Incorporated
OHN: Ontario Hydro Nuclear
OHT: Ontario Hydro Technologies
OM&A: Operations, Maintenance and Administration
PCB: Polychlorinated Biphenyl
PCDD: Polychlorinated dibenzo-p-dioxins
PCDF: Polychlorinated dibenzo-p-furans
PCP: Pentachlorophenol
ppb: parts per billion
ppm: parts per million
rem: Roentgen equivalent man
RETs: Renewable Energy Technologies
SDI: Sustainable Development Indicator
SED: Sustainable Energy Development
$S0_2$: Sulphur dioxide
$S0_3$: Sulphur trioxide
Sv: Sievert
Tg: Teragram (one trillion grams)
tonne: A metric ton - equal to one Megagram (Mg)
TS: Transformer/Transmission Station
TWh: Terawatt hour
VOC: Volatile Organic Compounds

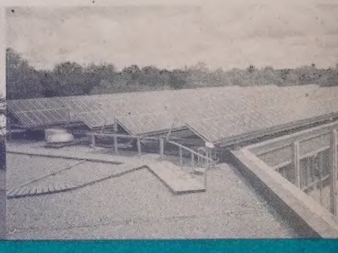

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